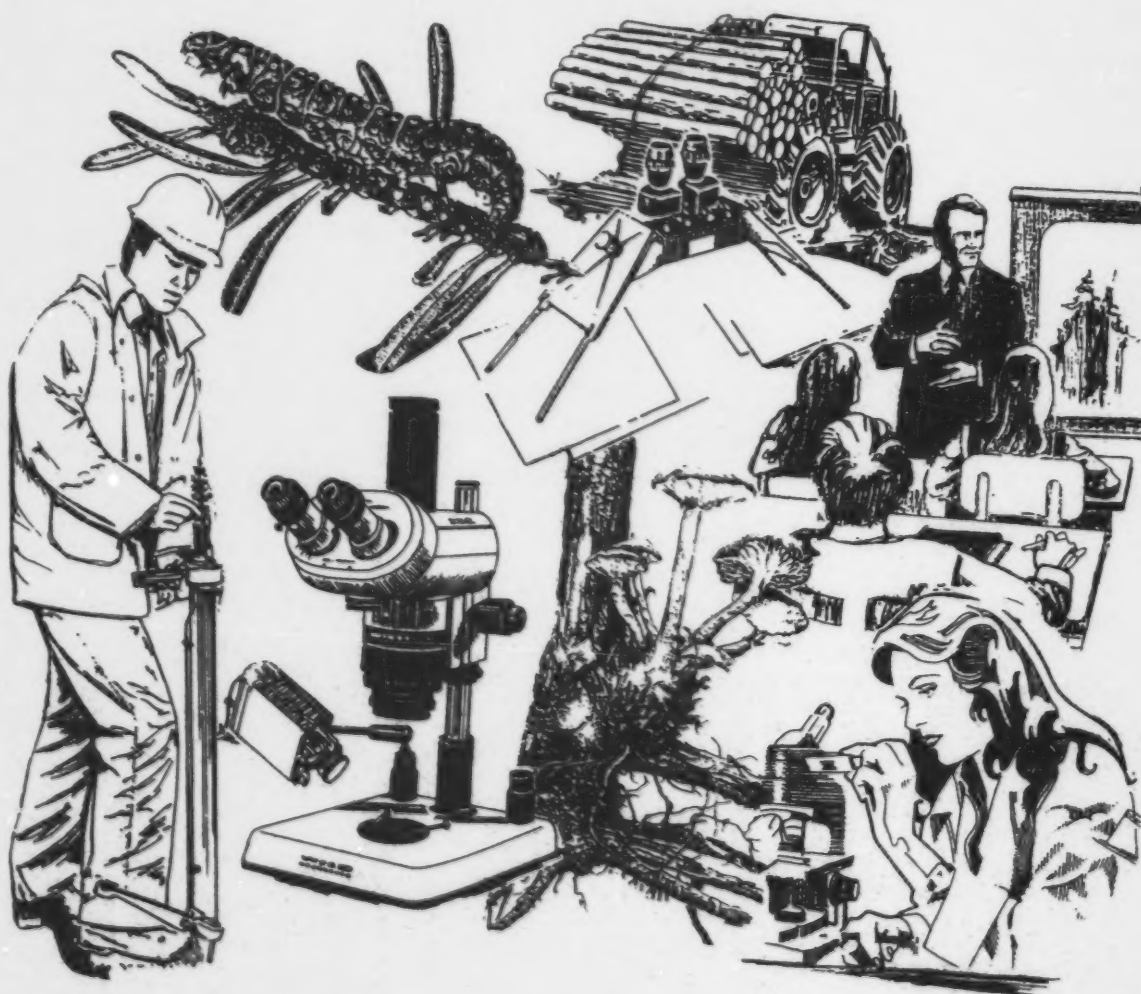




Program Plan 1990-91

Forestry Canada • Newfoundland and Labrador Region



Forestry
Canada

Forêts
Canada

91-00539/



This Forestry Canada publication uses recycled and recyclable paper.

PROGRAM PLAN 1990-91

**FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION**

**ST. JOHN'S, NEWFOUNDLAND
JULY, 1990**

FOREWORD

This Program Plan outlines the work program for Forestry Canada in the Newfoundland and Labrador Region for the fiscal year 1990-91.

The plan is a reflection of regional and national research and development priorities. These are established in a variety of ways. National priorities have been identified in Forestry Canada's new Strategic Plan, "Preparing for the Future" which was released last April. Regional priorities are established by management in consultation with clients and our research and development staff. Our Newfoundland and Labrador Forest Research Advisory Committee (NEWFRAC) provides ongoing input through annual meetings, field trips and other consultations. We have also undertaken a regional strategic planning exercise, involving our clients, to more clearly define the regional research issues and appropriate program initiatives.

The format of the plan has been revised over the past year to present essential information on our various projects and studies. If you require further information on any part of the plan, please contact us.

John A. Munro
Regional Director General

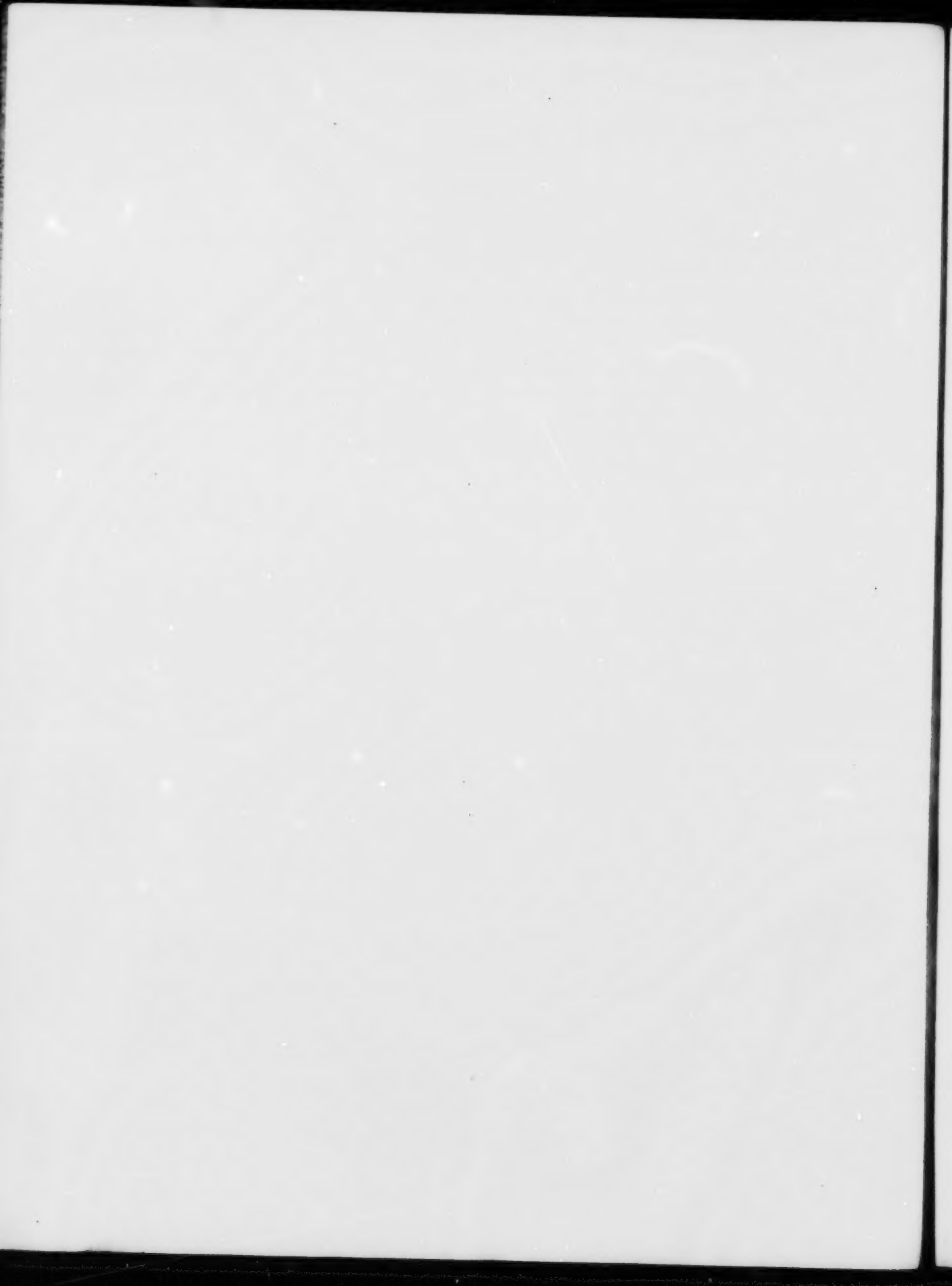


TABLE OF CONTENTS

<u>Project No.</u>		<u>Page</u>
	FOREWORD	i
	ENVIRONMENTAL SCREENING OF PROGRAM ACTIVITIES	vii
	FIGURE 1. FORCAN - NLR ORGANIZATIONAL STRUCTURE, 1990/91	ix
	FIGURE 2. A-BASE O & M ALLOCATION BY BUSINESS UNIT, 1990/91	x
	FIGURE 3. STRATEGIC FOREST SECTOR ISSUES	xi
	 1000 - ADMINISTRATION	
1111	PROGRAM MANAGEMENT - ADMINISTRATION	2
1121	COMMUNICATIONS	6
	<u>Study No.</u>	
	0000 - Communications management	6
	1301 - Advertising	6
	1302 - Publishing	6
	1303 - Media monitoring/relations	6
	1304 - Public opinion research & planning	7
	1305 - Public relations/inquiries	7
	1306 - Audio visuals, exhibits, graphics	7
	1307 - Employee communications	7
	1308 - Communications training	7
1211	FINANCIAL SERVICES	20
1221	ADMINISTRATIVE SERVICES	24
1231	HUMAN RESOURCES PLANNING	32

<u>Project No.</u>		<u>Page</u>
1333	ADVICE AND CONSULTATION SERVICES	35
1334	ECONOMIC ANALYSIS	41
	<u>Study No.</u>	
	3301 - Economic research of the provincial forest industry ...	41
	3302 - National forest economics program	41
	3303 - Economic research of the provincial forest resource ...	41
	2000 - RESEARCH AND TECHNICAL SERVICES	
2111	PROGRAM MANAGEMENT - RESEARCH AND TECHNICAL SERVICES	50
2211	ENVIRONMENTAL EFFECTS OF FORESTRY PRACTICES	56
	<u>Study No.</u>	
	4202 - Services to other agencies	56
	4204 - Impact of forestry practices on wildlife	56
	4205 - Effects of moose browsing on forest regeneration	56
	4206 - Environmental impact of whole tree harvesting	56
	4207 - Assessment of martin habitat	56
2213	ENVIRONMENTAL INFLUENCES ON FOREST GROWTH	65
	<u>Study No.</u>	
	2501 - Biometeorological research	65
	2502 - Wind effects on forests	65
	2503 - Bioenergy research	65
	2504 - Impact of climate change on forests	65

<u>Project No.</u>		<u>Page</u>
2214	FOREST AND PLANT ECOLOGY	73
	<u>Study No.</u>	
	4301 - Ecological investigations of wetlands for forestry	73
	<u>Study No.</u>	
	4302 - Ecological investigations of heathlands	73
	4303 - Forest classification and ecology	73
	4304 - The growth characteristics and ecology of larch, white spruce, and red pine in Newfoundland	73
	4305 - Soil chemical and physical properties and their relation to forest growth and nutrition	73
	4306 - Calibrating the FORCYTE model for Newfoundland	74
	4307 - Sensitivity of land to forest harvesting	74
2222	REFORESTATION	86
	<u>Study No.</u>	
	2202 - Competition control on forest sites	86
	2204 - Regeneration assessment	86
	2206 - Plantation research	86
	2207 - Site preparation research	86
	2208 - Population genetics of forest species	86
	2210 - Botwood kalmia trial	86
2223	TREE AND STAND GROWTH	96
	<u>Study No.</u>	
	2401 - Influence of stand density and fertilization	96
	2404 - Physiological process models of tree & stand growth	96

Project No.

Page

	2405 - Development of stand density management models	96
2232	PEST BIOLOGY RESEARCH	103
	<u>Study No.</u>	
	2701 - Factors damaging to cone crops	103
	2702 - Plantation and regeneration pests	103
	2703 - Balsam woolly adelgid	103
	2704 - Armillaria root rot	103
	2705 - Deterioration of insect damaged trees	104
	2706 - Decay and wood quality of living trees	104
	2707 - Role of woodborers and bark beetles in trees	104
	2708 - Population studies of major defoliators	104
	2709 - Biological mortality factors of major defoliators	104
	2710 - Impact of major defoliators	104
	2711 - Impact of spruce budworm on forest succession	104
	2712 - Effectiveness of insecticides	105
	2713 - Sex pheromone of the hemlock looper	105
2234	BIOLOGICAL CONTROL RESEARCH	126
	<u>Study No.</u>	
	2801 - Populations of biological control agents	126
	2802 - Control of forest insect pests with nematodes and fungi	126
	2803 - Effects of insecticides on the parasites of the hemlock looper	126

<u>Project No.</u>		<u>Page</u>
2251	GENERAL RESEARCH SUPPORT	132
	<u>Study No.</u>	
	601 - Seed and planting stock supply service	132
	602 - Chemical and physical analysis laboratory	132
	603 - Botanical herbarium	132
	604 - Greenhouse	132
	701 - Computer services	132
	702 - Mycological herbarium	133
	703 - Insect reference collection	133
2311	FOREST INSECT AND DISEASE SURVEY	143
	<u>Study No.</u>	
	2901 - Detecting & forecasting forest pest conditions	143
	3000 - FORESTRY DEVELOPMENT	
3111	PROGRAM MANAGEMENT - FORESTRY DEVELOPMENT	151
3235	FORESTRY YOUTH TRAINING COOPERATION AGREEMENT	154
	<u>Study No.</u>	
	4001 - On-site program: forestry youth training	154
	4002 - Forestry youth training program administration	154
	4003 - Communications: forestry youth training	154
3251	AGREEMENT ADMINISTRATION AND TECHNOLOGY TRANSFER	160
	<u>Study No.</u>	
	3601 - Agreement implementation and technology transfer	160

ENVIRONMENTAL SCREENING OF PROGRAM ACTIVITIES

This is to certify that all projects of the Newfoundland Forestry Centre have been subjected to a preliminary environmental screening. In the view of the committee, formal screening of any of the studies and/or projects is not required.

Most attention was given to studies which involve the introduction and/or trials of entomophagous organisms and the application of biological and chemical agents for the control of forest pests. The studies are described as follows:

- a) Introduction of a virus from Ontario for control of European pine sawfly in the St. John's area. For this study a permit for the introduction has been obtained from the Newfoundland Department of Environment. A permit from Agriculture Canada is not necessary because it is experimental and is being applied from the ground only. The virus has been applied annually to new infestations since 1982 (Study 2801).
- b) Greenhouse trials of a Rhabditid nematode and a native nematode, Neoplectana bibions, for control of forest pests, e.g. spruce budworm, hemlock looper, and balsam woolly aphid. These trials will be in cooperation with Memorial University researchers and conducted at the NeFC greenhouse. Conditions are carefully controlled within a greenhouse and environmental assessment is unnecessary at this stage of the study (Study 2802).
- c) Assistance is being given to the provincial Department of Forestry and Agriculture to conduct an experimental aerial spray of B.t. Bacillus thuringiensis against the blackheaded spruce budworm. Both federal and provincial permits were obtained to apply this biological insecticide. This insecticide is registered to aerial application for forestry use, however, it is not known how effective it is against the blackheaded budworm (Study 2713).
- d) The application of fertilizers to individual trees of balsam fir. This is an experimental application conducted by hand, and not adjacent to any water bodies or other potentially sensitive habitats (Study 2401).
- e) Greenhouse trials of various chemical herbicides and surfactants for control of Kalmia angustifolia. These trials will be conducted under environmentally controlled conditions within the greenhouse; environmental assessment is unnecessary at this stage of study (Study 2210).

In the province of Newfoundland and Labrador the provincial environmental screening process is firmly established and it is the view of the Committee (listed below) that additional formal screening at the federal level of the activities considered under this program plan is not necessary.

J.A. Munro, Regional Director General

J. Hudak, Program Director

R.S. van Nostrand, Program Director
Chairman, Forestry Canada, Newfoundland
and Labrador Region, EARP Committee

FORESTRY CANADA NEWFOUNDLAND AND LABRADOR REGION ORGANIZATIONAL STRUCTURE - 1990/91

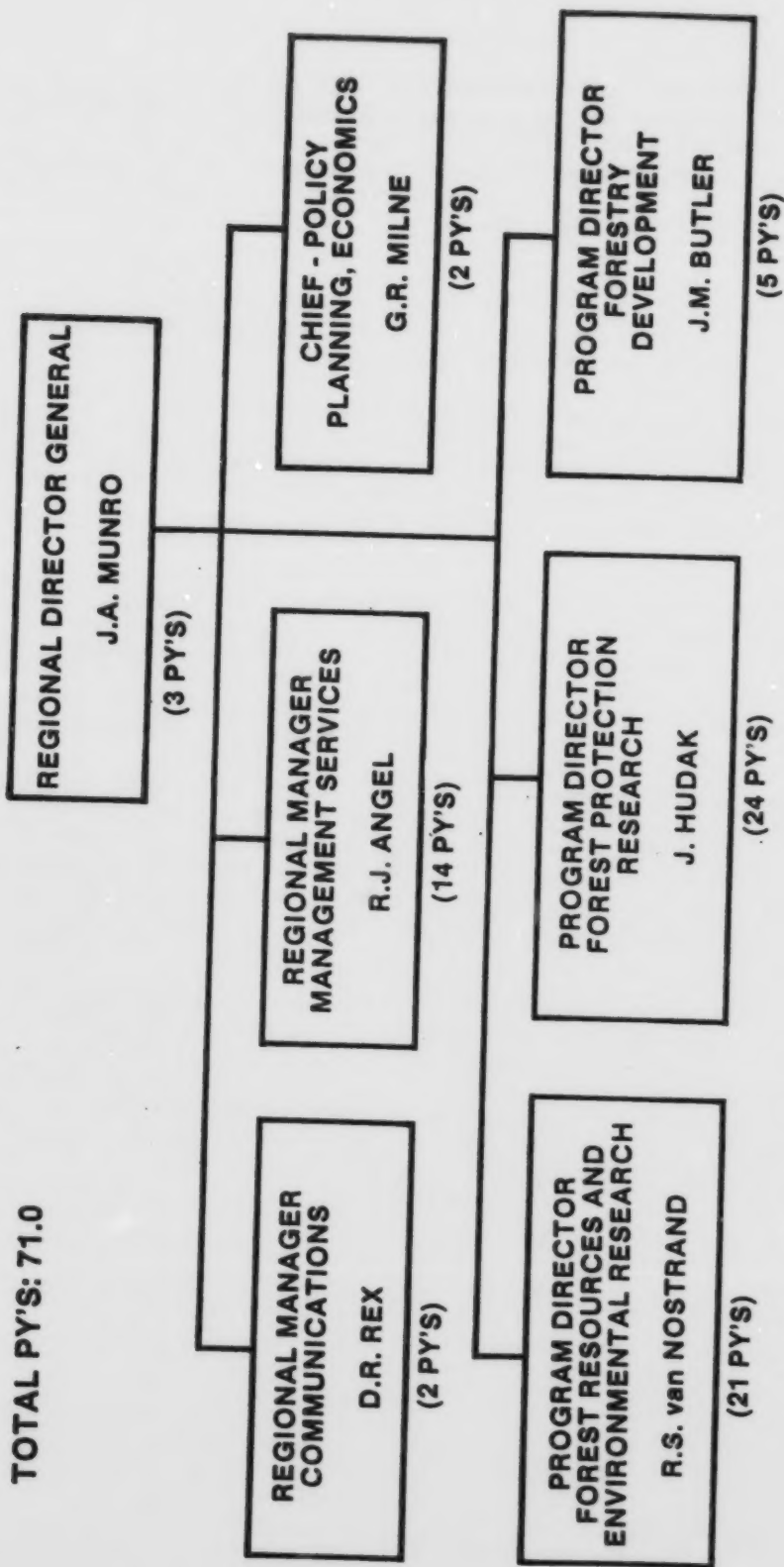
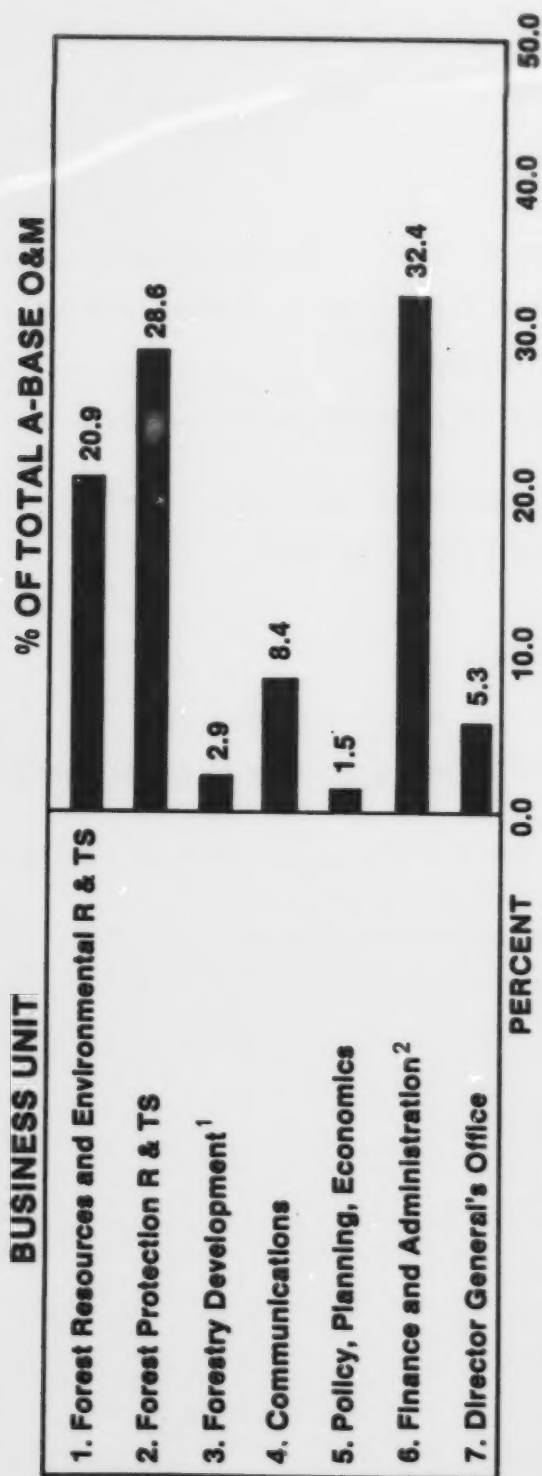


Figure 1. ForCan -- NLR organizational structure, 1990/91



Note : Total A-base O & M = \$865.3 K in 1990/91

¹ Excludes \$100 K in B-base O&M for training agreement

² Includes field stations, library, records, word processing pool, pay and benefits, purchasing, and financial and administrative services

Figure 2. A-base O & M allocation by business unit, 1990/91

FIGURE 3. STRATEGIC FOREST SECTOR ISSUES

Primary Issues

1. The effect of forestry practices on the environment
2. The loss of forests from fire, insects, disease, and pollutants
3. The uncertainty of wood supply
4. An inadequate knowledge of intensive forest management practices and ecological processes
5. Inadequate public information and technology transfer

Secondary Issues

6. Forest alienation to other uses
7. The need to improve forest legislation and policy
8. The inadequate adoption of new technology in forest harvesting and processing
9. Limited diversity in forest products and insufficient information on market potential
10. Lack of development of the Labrador forest

1000 - ADMINISTRATION



FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1111 PROGRAM MANAGEMENT - ADMINISTRATION

2. FORESTRY CANADA PROGRAM : 1100/1110

3. PROJECT PROFILE : 1990/91

Project Leader : J. MUNRO

Total A-Base P/Y's : 3.0

Total A-Base O&M : \$23.5

Total Other P/Y's : 0.0

Total Other O&M : 0.0

4. PROBLEM DEFINITION

Forestry Canada is responsible for administering the federal forestry research and development program in the Newfoundland and Labrador Region. In 1990 the full time staffing complement will be 71 person years, plus student employees. Overall expenditures will be approximately \$4.3 million for salaries and operational expenses and an estimated \$9.0 million for contributions to federal-provincial cost-shared development agreements. Effective program management is required to ensure the best use of human and financial resources in the delivery of programs.

5. OBJECTIVES

a) Project Objectives

1. To ensure efficient and effective management of the regional research and development programs of Forestry Canada.
2. To ensure that human and financial resources are effectively used to achieve stated goals and objectives.
3. To ensure that programs are responsive to the regional needs of client agencies and the national concerns of the Government of Canada.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Programs are regional in orientation but also reflect national priorities and concerns. Regional client input is provided through the Newfoundland Forest Research Advisory Committee. Main program elements are: Forest Resources and Environmental Research; Forest Protection Research; Forest Protection Research; Forest Economics Research; Forest Development; Management Services; and Communications.

b) Project Highlights, 1989/90

In 1989/90 overall direction was provided for all programs. Special efforts were made to improve human resources management. Through participation in the Forestry Canada Organization Climate Survey internal organizational problems were identified and corrective measures initiated. Special efforts were made to identify staff training needs and implement appropriate courses. Some internal resource shifts were made in line with priorities identified in our Strategic Plan.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

8. LONG TERM PROJECTIONS

- 1111 Continue to provide overall direction and control to Forestry Canada operations in the Region.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- Provincial Department of Forestry and Agriculture
- Atlantic Canada Opportunities Agency
- Employment and Immigration Canada
- Provincial and federal departments of Environment
- Forest industry
- Memorial University of Newfoundland
- Other federal and provincial resource based agencies, private consultants and industries.

10. EVALUATIONS

All major projects receive formal evaluations on a three year cycle. In cooperation with the province, evaluations are also conducted on Federal/Provincial cost shared forestry programs.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/41 [RR/PP]
 TITLE: PROGRAM MANAGEMENT
 RESP. CENTRE: 4111 LEADER: MUNRO, J.A.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 1111
 EVALUATION-PREV: 00/00 NEXT: /

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$100.9	\$96.2	\$96.2	\$103.4	\$103.4	\$0.0	\$0.0
O&M	\$27.9	\$48.0	\$48.0	\$23.5	\$30.0	\$18.0	\$18.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$27.9	\$48.0	\$48.0	\$23.5	\$30.0	\$18.0	\$18.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
GAC	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$128.8	\$144.2	\$144.2	\$126.9	\$133.4	\$18.0	\$18.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	1.0	1.0
PY-O	2.0	2.0	2.0	3.0	3.0	1.0	1.0
TOTL	2.0	2.0	2.0	3.0	3.0	2.0	2.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 OVERALL MANAGEMENT AND PLANNING FOR ALL CFS OPERATIONS IN THE NEWFOUNDLAND AND LABRADOR REGION.

TECHNOLOGY CENTRES POLICY (\$000)							
A	Contracting-In		\$.		(External Agencies)		
B	Grants and Contributions		\$.		(External Agencies)		
C1	In-Kind Contributions		\$.		(Forestry Canada)		
C2	In-Kind Contributions		\$.		(External Agencies)		
D	Royalties and Licenses		\$.				

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1121 COMMUNICATIONS

2. FORESTRY CANADA PROGRAM : 1100/1120

3. PROJECT PROFILE : 1990/91

Project Leader : D.R. REX
Total A-Base P/Y's : 2.0
Total A-Base O&M : 73K

Total Other P/Y's : 0.0
Total Other O&M : 0.0

Strategic Forest Sector Issues: 5

Studies:

0000 COMMUNICATIONS MANAGEMENT

Study Leader : D.R. REX
A-Base P/Y's : 0.5
A-Base O & M : 6.0K
Initiated : 1988

Other P/Y's : 0.0
Other O & M : 0.0

1301 ADVERTISING

Study Leader : H. DUNPHY
A-Base P/Y's : 0.1
A-Base O & M : 1K
Initiated : 0

Other P/Y's : 0.0
Other O & M : 0.0

1302 PUBLISHING

Study Leader : H. DUNPHY
A-Base P/Y's : 0.2
A-Base O & M : 40K
Initiated : 0

Other P/Y's : 0.0
Other O & M : 0.0

1303 MEDIA MONITORING/RELATIONS

Study Leader : H. DUNPHY
A-Base P/Y's : 0.2
A-Base O & M : 1K
Initiated : 0

Other P/Y's : 0.0
Other O & M : 0.0

1304 PUBLIC OPINION RESEARCH & PLANNING

Study Leader : D.R. REX

A-Base P/Y's : 0.1

A-Base O & M : 1K

Initiated : 0

Other P/Y's : 0.0

Other O & M : 0.0

1305 PUBLIC RELATIONS/INQUIRIES

Study Leader : D.R. REX / H. DUNPHY

A-Base P/Y's : 0.4

A-Base O & M : 2K

Initiated : 0

Other P/Y's : 0.0

Other O & M : 0.0

1306 AUDIO VISUALS, EXHIBITS, GRAPHICS

Study Leader : H. DUNPHY

A-Base P/Y's : 0.2

A-Base O & M : 20K

Initiated : 0

Other P/Y's : 0.0

Other O & M : 0.0

1307 EMPLOYEE COMMUNICATIONS

Study Leader : D.R. REX

A-Base P/Y's : 0.1

A-Base O & M : 1K

Initiated : 0

Other P/Y's : 0.0

Other O & M : 0.0

1308 COMMUNICATIONS TRAINING

Study Leader : D.R. REX

A-Base P/Y's : 0.1

A-Base O & M : 1K

Initiated : 0

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

- 1121 Forestry Canada in the Newfoundland and Labrador Region acknowledges that a major issue in the forest sector has been the inadequacy of information transfer within the forest community and to the public at large. For its part, Forestry Canada realizes that existing processes currently being used to determine and evaluate client needs/concerns and to transfer the required technology should be improved. However, client groups of Forestry Canada in this region vary from technical to para-technical, from specialists to generalists and from collaborators to lay publics. Because of this vast divergence of audiences, a specialized communications program based on individual group needs and characteristics is required to ensure and improve the process of obtaining and disseminating information.

5. OBJECTIVES

a) Project Objectives

- 1121 To develop and implement a systematic approach to solicit client and other publics' input into regional programs and to raise awareness of these programs through an improved information transfer process.

b) Study Objectives

- 0000 To ensure that financial and personnel resources allocated to the Region's communications program are used effectively and in accordance with the policies and guidelines of the Government of Canada.
- 1301 To raise the profile of Forestry Canada and its programs in the public sector.
- 1302 To ensure that material published by the Region is prepared in accordance with Forestry Canada policy, and that the mass production and distribution of that material is conducted in a cost efficient manner.
- 1303 To determine general issues within the forest sector and to establish working relationships with media representatives to facilitate the information transfer process.
- 1304 To receive feedback on Forestry Canada program initiatives and related issues.
- 1305 To increase the public's awareness of Forestry Canada's programs and to increase the knowledge, appreciation and understanding of the significance of the forest resource sector.
- 1306 To coordinate the Region's requirement in support of publications and other transfer media.
- 1307 To monitor and assess employee reactions and attitudes on matters pertaining to the work environment and to provide advice and support to employees to facilitate external communications.
- 1308 To assess the Region's requirements and recommend appropriate action.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 1121 Communications has been a significant part of the Region's operations since 1967. In recent years, the project has been expanded to include responsibilities associated with publishing, technology transfer, Canada-Newfoundland Forest Resource Development Agreement (FRDA), ministerial and national communications programs. As a result,

emphasis has shifted from direct contact and reactive to pro-active activities facilitated by communications technology both electronic and print. Highlighting the achievements in recent years have been efforts to improve the aesthetics and presentability of publications and technical posters establishing communications as an integral component of the regions scientific and development programs, and improving processes associated with publishing and other technology transfer initiatives.

b) Project Highlights, 1989/90

- 1121 Communications activities in support of the Canada-Newfoundland Forest Resource Development Agreement dominated fiscal year 1989-90. Advertising was a significant aspect of the program as was the design, production and distribution of promotional items at various venues. Activities in support of the region's "A" base program were highlighted by ongoing improvements and modifications to the publishing process. Logistical and technical support was provided to a number of technology transfer initiatives of both research program and National Forest Week (which received full participation from regional staff) was coordinated by the Communications group. Support to headquarters, Minister's office and cooperating agencies was provided on an as required basis.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
0000	To re-examine all contracts for specialized services. Establish a listing of professional services.		To re-examine all contracts for specialized services. Establish a listing of professional services	To exercise greater managerial discretion in comms. activities.	Improve managerial control methodology as required.
0000	To exercise greater managerial discretion in comms. activities	Managerial authority and responsibility delegated.			
	To obtain additional resources on permanent basis	One additional PY permanently assigned			
	Improve procedure for establishing comms priorities	Achieved			

GOALS VS: ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
0000	Improve managerial competence	Attended a 3-week MMOP course.			
1301	To conduct an advertising program during NFW and for resource supplements of print media	Achieved	To conduct an advertising program during NFW and for resource supplements of print media.	To conduct an advertising program during NFW and for resource supplements of print media.	To conduct an advertising program during NFW and for resource supplements of print media.
1302	Re-examine publication review and production process	Liaison with printers on-going.	Provide active offer in other language. Increase funding base for publications.	Review cost effectiveness of print medium.	Re-examine publication review and production process.
	Review N-X- mailing list	Mailing list updated	Produce Woody Points.	Produce Woody Points.	Review N-X- mailing list.
	Establish listing of professional services	Established	Produce Program Review book.	Produce Program Review.	Review Woody Points mailing lists.
			Print and distribute N-X- publications.	Print and distribute N-X- publications.	Produce Woody Points.
					Print and distribute N-X- publications.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	Provide regional input into national publication policy	Input as requested.			
	Print and distribute N-X- publications	Achieved			
	Provide translation services	Translation services provided.			
	Conduct cost analysis of printing	Cost analysis completed.			
	Produce Program Review booklet	Produced			
	Produce four editions of newsletter	Produced			

GOALS VS. CHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
1303	Continue press clipping service	Press clipping provided "in-house"	Continue press clipping service.	Continue press clipping service.	Continue press clipping service.
	Continue media liaison with emphasis on St. John's media	Liaison conducted.	Continue media liaison.	Continue media liaison.	Continue media liaison.
	Visit key media contacts throughout region	Liaison conducted			
1304	To establish Research and planning process	Initiated (language preference survey conducted).	To conduct systematic analysis.	To conduct systematic analysis.	To conduct systematic analysis.
1305	To provide information to public on request	Requests were actioned as required.	Maintain Program	Maintain Program	Maintain Program
	To participate actively during NFW	Participated in NFW in Stephenville.			

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
1306	Maintain Program and expand as resources permit	Maintained			
	To participate in Arbor Day activities	Participated in Arbor Day activities held in St. John's			
	Held an open house at Forestry Canada's Greenhouse	Successful open house held at the Greenhouse in Mount Pearl			
	Initiate ad-hoc PR activities as available	Distributed promotional material.			
	Provide guidance and advice as requested	Assistance provided during the preparation of reports and posters.	Maintain existing coordinating and financial control of activity.	Maintain existing coordinating and financial control of activity.	Maintain existing coordinating and financial control of activity.
	To coordinate regional requirement.				

GOALS VS. CHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
1307	To advise staff on matters pertaining to Forestry Canada policy.	Ongoing.	Maintain existing level of study.	Maintain existing level of study.	Maintain existing level of study.
	To provide assistance as requested in support of external Comms.	Assistance provided as requested.			
1308	To upgrade professional qualifications of Comms. personnel	Upgrading courses taken at post-secondary institute.	As per 1989/90.	As per 1990/91.	As per 1991/92.

8. LONG TERM PROJECTIONS

As a result of the policy of the Government of Canada which places renewed emphasis on examining the public environment, the project will concentrate its efforts on processes to assess and evaluate wants, needs, perceptions and understanding of programs. It is anticipated that Forestry Canada through this project, will assume a greater leadership role in coordinating an ever expanding public awareness program in cooperation with other sector organizations. The project will address inadequacies in the region's technology transfer process by developing an improved program of transfer in cooperation with major client agencies in the region.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

PRINCIPAL COOPERATING AGENCIES

Abitibi-Price Inc.
 Corner Brook Pulp and Paper Co. Ltd.
 Department of Forestry and Agriculture
 Forestry Canada Headquarters
 Atlantic Canada Opportunities Agency

CLIENT AGENCIES

Primary

Forest industry officials
 Provincial Government officials
 Scientific community
 Forestry Canada officials

Secondary

ENGO's (wildlife, environment and recreation groups)
 Other federal government departments
 Forestry schools
 Secondary and elementary schools
 News media
 Federal members of Parliament

Tertiary

Domestic users of the resource
 Business community
 Development associations
 Adult residents (urban and rural)
 Politicians (provincial and municipal)

10. EVALUATIONS

The project was last reviewed in 1988 by a peer committee consisting of members representing all principal cooperating agencies. A further review is expected in 1992.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/45 [RR/PP]
 TITLE: COMMUNICATIONS MANAGEMENT
 RESP. CENTRE: 4121 LEADER: REX, D.R.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1121
 EVALUATION-PREV: / NEXT: 04/92

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$0.0	\$0.0	\$0.0	\$20.3	\$20.3	\$0.0	\$0.0
O&M	\$0.0	\$5.0	\$5.0	\$6.0	\$7.5	\$10.0	\$10.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$0.0	\$5.0	\$5.0	\$6.0	\$7.5	\$10.0	\$10.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$0.0	\$5.0	\$5.0	\$26.3	\$27.8	\$10.0	\$10.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	0.0	0.0	0.0	0.5	0.5	0.0	0.0
TOTL	0.0	0.0	0.0	0.5	0.5	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO PROVIDE MANAGEMENT SUPPORT TO INDIVIDUAL PROJECT STUDIES AND TO FACILITATE
 CORPORATE INITIATIVES OF FORCAN HEADQUARTERS AND OFFICE OF THE MINISTER.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/13 [RR/PP]
 TITLE: INFORMATION SERVICES
 RESP. CENTRE: 4131 LEADER: REX, D.R.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 1121
 EVALUATION-PREV: 00/00 NEXT: 04/91

	1988-89	1989-90		1990-91			
	ACTUAL	BUDGET	REVISED	UPCOMING	PLANNING	PLANNING	PLANNING
	31/03/89	01/04/89	01/04/89	00/00/00	YEAR 1	YEAR 2	YEAR 3

FINANCIAL RESOURCES (\$000)							
SAL	\$31.9	\$35.8	\$14.3	\$61.0	\$16.3	\$10.0	\$10.0
O&M	\$55.4	\$60.0	\$60.0	\$67.0	\$77.5	\$90.0	\$90.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$55.4	\$60.0	\$60.0	\$67.0	\$77.5	\$90.0	\$90.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$87.3	\$95.8	\$74.3	\$128.0	\$93.8	\$100.0	\$100.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.7	0.7
PY-O	0.5	1.0	0.4	1.5	0.4	0.0	0.0
TOTL	0.5	1.0	0.4	1.5	0.4	0.7	0.7

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO CONDUCT A FOREST INFORMATION PROGRAM DESIGNED TO IMPROVE AWARENESS OF ON-GOING RESEARCH. TO PROVIDE TECHNICAL ADVICE TO THE PUBLIC AND VARIOUS ORGANIZATION ON FORESTRY MATTERS. TO PROVIDE TECHNICAL ADVICE TO RESEARCHERS ON THE PRODUCTION OF TECHNICAL INFORMATION PUBLICATIONS.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1211 FINANCIAL SERVICES

2. FORESTRY CANADA PROGRAM : 1200/1210

3. PROJECT PROFILE : 1990/91

Project Leader : R.J. ANGEL

Total A-Base P/Y's : 4.0

Total A-Base O&M : 15.0

Total Other P/Y's : 0.0

Total Other O&M : 0.0

4. PROBLEM DEFINITION

The annual operating budget of the Newfoundland and Labrador Region is \$4.7 million which includes funding for salaries, operating and maintenance and capital expenditures in research and technical services. A new five (5) year \$64.0 million Forestry Development Agreement is under negotiation. A three (3) year and three (3) month Forestry Youth Training Agreement for \$9.0 million came into effect in February 1990.

5. OBJECTIVES

a) Project Objectives

- (1) To provide financial consulting and advisory services to Management of the Newfoundland and Labrador Region.
- (2) To ensure adequate internal control of financial resources, provide a complete range of accounting services and maintain proper accounting records.
- (3) To administer the financial controls on Federal - Provincial Development Agreements and other special programs.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Financial, accounting and advisory services have been provided for the Forestry Research and Technical Services section of the Newfoundland

and Labrador Region for over twenty (20) years. Monthly and annual financial status reports were produced according to schedule or on demand as required. Audits of financial transactions and related work were performed periodically and contained no major observations.

b) Project Highlights, 1989/90

- (1) Introduction of a new monthly financial report for managers.
- (2) Full implementation of the personnel person year system.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

8. LONG TERM PROJECTIONS

- (1) Implementation of the Terra Data Financial Reporting System.
- (2) Implement enhancements to the Person Year Reporting System, the Work Plan System and other management reporting systems.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Provincial Department of Forest Resources and Lands, Inter-Government Affairs and the Auditor General. Other cooperators include other Federal Departments and Agencies.

10. EVALUATIONS

Periodic evaluations are undertaken by the Auditor General's Department and Forestry Canada Audit and Evaluation Section.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
(CANADA)INTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/11 [RR/PP]
 TITLE: FINANCIAL SERVICES
 RESP. CENTRE: 4121 LEADER: WALSH W.F.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 1211
 EVALUATION-PREV: 00/00 NEXT: /

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

----- FINANCIAL RESOURCES (\$000) -----

SAL	\$127.2	\$130.6	\$130.6	\$147.4	\$147.4	\$0.0	\$0.0
O&M	\$13.6	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$13.6	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$140.8	\$145.6	\$145.6	\$162.4	\$162.4	\$15.0	\$15.0

----- PERSON YEARS - PROFESSIONAL & OTHER -----

PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	4.0	4.0	4.0	4.0	4.0	0.0	0.0
TOTL	4.0	4.0	4.0	4.0	4.0	0.0	0.0

----- COOPERATORS RESOURCES (\$000) -----

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

----- DESCRIPTION -----
 TO ADMINISTER THE FINANCIAL CONTROLS ON FEDERAL/PROVINCIAL DEVELOPMENT AGREEMENTS. TO PROVIDE FINANCIAL CONSULTING AND ADVISORY SERVICE TO NFC MANAGEMENT. TO ENSURE ADEQUATE INTERNAL CONTROL OF FINANCES AND TO PROVIDE A COMPLETE RANGE OF ACCOUNTING SERVICES AND TO MAINTAIN ADEQUATE ACCOUNTING RECORDS.

----- TECHNOLOGY CENTRES POLICY (\$000) -----

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1221 ADMINISTRATIVE SERVICES

2. FORESTRY CANADA PROGRAM : 1200/1220

3. PROJECT PROFILE : 1990/91

Project Leader : R.J. ANGEL

Total A-Base P/Y's : 10.0

Total A-Base O&M : 265.0

Total Other P/Y's : 0.0

Total Other O&M : 0.0

4. PROBLEM DEFINITION

The Newfoundland and Labrador Region has a personnel establishment of 71 person years and undertakes research activities in all parts of the Province. In St. John's, it operates from two (2) buildings administered by Public Works Canada. Also, a research greenhouse is maintained at Mount Pearl and research field stations are located at Badger, Pasadena and North Pond, Gambo.

5. OBJECTIVES

a) Project Objectives

To ensure effective management support in pay and benefits, material management, records management, tenant services, word processing services, library services and field station services.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Over the past three (3) years several computerized support systems were introduced to the region. During 1989-90 enhancements were made to the Material Management System and the Sydney Library System. A major initiative was made to improve the Computer Communications System for the Region. The Human Resources Information System was implemented during the past fiscal year.

b) Project Highlights, 1989/90

1. Implementation of the Human Resources Information System.
2. Upgrading Computer Communications System.
3. Field Station improvements carried out through the minor capital construction program.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

8. LONG TERM PROJECTIONS

1. Introduction of the computerized On Line Pay System with the Department of Supply and Services.
2. Implementation of additional components of the Sydney Library System.
3. Implementation of a computerized records management system.
4. Interface with the Department of Supply and Services to implement the PASS purchasing system.
5. Replacement of the present word processing equipment with a more advanced system to meet changing word processing requirements.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

1. Federal Department of Public Works.
2. Labor Canada.
3. National Health and Welfare.
4. Canada Employment Commission.
5. Supply and Services Canada.

10. EVALUATIONS

Periodic in-house evaluations are conducted by Management and by Corporate Audit Group. Inspections of services are carried out from time to time by Labor Canada, Public Works Canada and by Health and Welfare Canada.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/44 [RR/PP]
 TITLE: ADMINISTRATIVE SERVICES
 RESP. CENTRE: 4121 LEADER: ANGEL, R.J.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 1221
 EVALUATION-PREV: 03/86 NEXT: 03/87

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$46.5	\$37.7	\$40.7	\$50.9	\$50.9	\$0.0	\$0.0
O&M	\$117.9	\$108.0	\$108.0	\$108.0	\$108.0	\$115.0	\$115.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$117.9	\$108.0	\$108.0	\$108.0	\$108.0	\$115.0	\$115.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$120.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$164.4	\$145.7	\$148.7	\$158.9	\$278.9	\$115.0	\$115.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	1.0	1.0	1.0	1.0	1.0	0.0	0.0
TOTL	1.0	1.0	1.0	1.0	1.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 MANAGEMENT SERVICES IN SUPPORT OF ALL FIXED COSTS FOR THE RESEARCH CENTRE AND
 MANAGER, MANAGEMENT EXPENSES.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/16 [RR/PP]
 TITLE: RECORDS MANAGEMENT/TENANT SERVICES
 RESP. CENTRE: 4121 LEADER: FENNELLY, L.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1221
 EVALUATION-PREV: 03/88 NEXT: 03/89

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)

SAL	\$32.5	\$37.7	\$37.7	\$40.2	\$40.2	\$0.0	\$0.0
O&M	\$16.8	\$15.0	\$15.0	\$11.0	\$11.0	\$11.0	\$11.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$16.8	\$15.0	\$15.0	\$11.0	\$11.0	\$11.0	\$11.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$49.3	\$52.7	\$52.7	\$51.2	\$51.2	\$11.0	\$11.0

PERSON YEARS - PROFESSIONAL & OTHER

PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	1.0	1.0	1.0	1.0	1.0	0.0	0.0
TOTL	1.0	1.0	1.0	1.0	1.0	0.0	0.0

COOPERATORS RESOURCES (\$000)

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

DESCRIPTION

TO PROVIDE RECORDS MANAGEMENT AND TENANT SERVICES AT NeFC.

TECHNOLOGY CENTRES POLICY (\$000)

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/17 [RR/PP]
 TITLE: WORD PROCESSING SERVICES
 RESP. CENTRE: 4121 LEADER: ANGEL, R.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1221
 EVALUATION-PREV: 03/88 NEXT: 03/89

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$46.7	\$58.6	\$47.3	\$46.5	\$46.5	\$0.0	\$0.0
O&M	\$8.4	\$8.0	\$8.0	\$12.0	\$14.0	\$14.0	\$14.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$8.4	\$8.0	\$8.0	\$12.0	\$14.0	\$14.0	\$14.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$55.1	\$66.6	\$55.3	\$58.5	\$60.5	\$14.0	\$14.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	3.0	2.5	2.0	2.0	2.0	0.0	0.0
TOTL	3.0	2.5	2.0	2.0	2.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO PROVIDE WORD PROCESSING SERVICES AT NeFC.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/18 [RR/PP]
 TITLE: PAY & BENEFITS SERVICES
 RESP. CENTRE: 4121 LEADER: J. MACFARLANE
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1221
 EVALUATION-PREV: 03/88 NEXT: 03/89

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)

SAL	\$26.1	\$24.6	\$24.6	\$22.8	\$22.8	\$0.0	\$0.0
O&M	\$5.8	\$5.0	\$5.0	\$2.0	\$2.0	\$2.0	\$2.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$5.8	\$5.0	\$5.0	\$2.0	\$2.0	\$2.0	\$2.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$31.9	\$29.6	\$29.6	\$24.8	\$24.8	\$2.0	\$2.0

PERSON YEARS - PROFESSIONAL & OTHER

PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	1.0	1.0	1.0	1.0	1.0	0.0	0.0
TOTL	1.0	1.0	1.0	1.0	1.0	0.0	0.0

COOPERATORS RESOURCES (\$000)

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

DESCRIPTION

TO PROVIDE PAY & BENEFITS SERVICES AT NeFC.

TECHNOLOGY CENTRES POLICY (\$000)

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/19 [RR/PP]
 TITLE: MATERIAL MANAGEMENT SERVICES
 RESP. CENTRE: 4121 LEADER: BANNISTER, F.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1221
 EVALUATION-PREV: 03/88 NEXT: 03/89

	1988-89	1989-90		1990-91			
	ACTUAL	BUDGET	REVISED	UPCOMING	PLANNING	PLANNING	PLANNING
	31/03/89	01/04/89	01/04/89	00/00/00	YEAR 1	YEAR 2	YEAR 3

FINANCIAL RESOURCES (\$000)							
SAL	\$56.9	\$54.8	\$54.8	\$56.8	\$56.8	\$0.0	\$0.0
O&M	\$3.5	\$4.0	\$4.0	\$10.0	\$10.0	\$10.0	\$10.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$3.5	\$4.0	\$4.0	\$10.0	\$10.0	\$10.0	\$10.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$60.4	\$58.8	\$58.8	\$66.8	\$66.8	\$10.0	\$10.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	2.0	2.0	2.0	2.0	2.0	0.0	0.0
TOTL	2.0	2.0	2.0	2.0	2.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO PROVIDE MATERIAL MANAGEMENT SERVICES AT NeFC.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1231 HUMAN RESOURCES PLANNING

2. FORESTRY CANADA PROGRAM : 1200/1230

3. PROJECT PROFILE : 1990/91

Project Leader : J. MUNRO

Total A-Base P/Y's : 0.0

Total A-Base O&M : 24K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

4. PROBLEM DEFINITION

Improved human resources planning has been identified as a national priority for Forestry Canada to raise productivity and improve service to clients. A national Organization Climate Survey was undertaken in 1989-90 which identified problem areas within the organization and recommended appropriate corrective measures.

5. OBJECTIVES

a) Project Objectives

Improved management of human resources in the region through appropriate staff training and development programs.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Previously staff training and development program funds were not identified separately. Training and other human resources management programs are now consolidated under this project heading to facilitate planning and control.

b) Project Highlights, 1989/90

A variety of training activities have been funded. Over the past year priority was given to courses designed to improve staff capabilities

in the use of computers, technical writing and health and safety. Special development leave for one research scientist was also supported.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

8. LONG TERM PROJECTIONS

Continue to coordinate and fund human resources management programs.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Public Service Commission.

10. EVALUATIONS

Annual review by the establishment management committee in consultation with the Personnel Advisor and staff representatives.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/71 [RR/PP]
 TITLE: HUMAN RESOURCE PLANNING
 RESP. CENTRE: 4111 LEADER: MUNRO, J.A.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 1231
 EVALUATION-PREV: / NEXT: /

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)						
SAL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
O&M	\$0.0	\$22.5	\$22.5	\$24.0	\$25.0	\$30.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$0.0	\$22.5	\$22.5	\$24.0	\$25.0	\$30.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$0.0	\$22.5	\$22.5	\$24.0	\$25.0	\$30.0

PERSON YEARS - PROFESSIONAL & OTHER						
PY-P	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	0.0	0.0	0.0	0.0	0.0	0.0
TOTL	0.0	0.0	0.0	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)						
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 THE STUDIES UNDER THIS PROJECT IDENTIFY THE ESTABLISHMENT RESPONSE TO THE
 HUMAN RESOURCE PLANNING PRIORITIES SET BY CFS HQ.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1333 ADVICE AND CONSULTATION SERVICES

2. FORESTRY CANADA PROGRAM : 1300/1330

3. PROJECT PROFILE : 1990/91

Project Leader : G.R. MILNE

Total A-Base P/Y's : 0.7

Total A-Base O&M : 4.5K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

Strategic Forest Sector Issues: 5, 7

4. PROBLEM DEFINITION

Effective planning, policy formulation and analysis are fundamental to improve public forest resource management and industrial development initiatives. The provision of effective advice on forest economics, policy, and planning to external clients is an important function of ForCan - NLR economists. In addition, expertise in these areas is often sought by management and staff within the Centre, for example in strategic planning, forest resource development, and research.

5. OBJECTIVES

a) Project Objectives

The objectives of this project are to:

- 1) provide ongoing advisory services in policy, planning, and economics to clients within the Centre, and in external agencies;
- 2) maintain and improve the regional data base of forest resource, industrial, and economic information;
- 3) continue to support forestry development activities through the planning, negotiation, and evaluation of cost-shared forestry agreements and related initiatives;
- 4) represent the department on regional and national committees relating to forest economics, policy, and statistics.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

This project was initiated in 1972. Highlights have included providing advice on forest economics and policy to the 1980 Newfoundland Royal Commission on Forest Protection and Management, and to various Provincial departments in areas of resource pricing and taxation. The economists continue to play a key role in FRDA's, particularly in the planning and evaluation phases. The regional input to national FORSTATS surveys has been coordinated by economists, for example national inventory, silviculture, and seed collection. During the past three years, the Branch has led the development of a regional strategic plan and operational planning system.

b) Project Highlights, 1989/90

With planning, the regional strategic plan was updated, and a new operational planning system implemented. A paper on regional planning was presented at an international IUFRO meeting. Advice and input were provided to HQ for the national strategic plan. In forestry development, an interim evaluation report was completed by consultants for the FRDA. In addition, input and advice were provided for a new Labrador Forestry Agreement, and to investors interested in establishing a sawmill in the Happy Valley-Goose Bay region. Considerable advice was provided to a number of clients about the Newfoundland sawmill industry.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Atlanticon Ltd. 1989. Interim evaluation report of the Canada-Newfoundland Forest Resource Development Agreement. Prepared for the Evaluation Committee, FRDA. May, 1989. 72 pp.

Milne, G.R. and J. Middlemiss. 1989. Evaluation framework. Background for the evaluation of FRDA II, prepared by the Evaluation Committee. January, 1990. 25 pp.

Milne, G.R. 1989. IUFRO meeting on research management and planning. Woody Points, Vol. 18, No. 2.

iv) Lectures, Seminars, and Scientific Addresses:

Milne, G.R. 1989. Program review and strategic planning for the Newfoundland Forestry Centre. Paper presented at IUFRO working group meeting, April, 1989, Farnham, England. 15 pp.

v) Other Technology Transfer:

Nil

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
3301	Complete final draft of strategic plan and publish	Plan completed, but not published due to delay in national strategic plan	Continue general advisory work at regional and national levels	Continue general advisory work at regional and national levels	Continue general advisory work at regional and national levels
	Ensure operational plan completed and system debugged	Interim system used for 1989/90, new system completed for 1990/91	Ensure final evaluation of FRDA I is completed	Revise strategic plan and coordinate operational planning	
	Receive final draft of interim evaluation report	Report received and accepted	Revise strategic plan and coordinate operational planning		
	Continue advice, especially for FRDA II planning	Profile report and evaluation framework completed	Publish regional statistics report		
	Contribute to departmental review of FORSTATS program	Completed	Contribute to national review of economics program		
	Develop regional data base and publish report	Data base compiled			
		Participated in national review of economics program			

8. LONG TERM PROJECTIONS

This project is ongoing and will continue to address the objectives stated in part 5.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Main clients will continue to include ForCan - NLR managers and staff, the Provincial Department of Forestry and Agriculture, and Newfoundland forest industry. Other clients and cooperators include a number of federal and provincial government agencies, and Memorial University.

10. EVALUATIONS

This project is normally not part of the department's program or project review process.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/31 [RR/PP]
 TITLE: ADVICE AND CONSULTATION SERVICES
 RESP. CENTRE: 4111 LEADER: MILNE, G.
 PROGRAM: 00 STATUS: A (A/I/F/D)
 EVALUATION-PREV: 00/00 NEXT: / SUB-ELEMENT: 1333

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)

SAL	\$34.2	\$28.7	\$38.3	\$40.1	\$0.0	\$0.0	\$0.0
O&M	\$2.0	\$6.0	\$6.0	\$4.5	\$2.5	\$6.0	\$6.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$2.0	\$6.0	\$6.0	\$4.5	\$2.5	\$6.0	\$6.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$36.2	\$34.7	\$44.3	\$44.6	\$2.5	\$6.0	\$6.0

PERSON YEARS - PROFESSIONAL & OTHER

PY-P	0.7	0.6	0.8	0.8	0.0	0.0	0.0
PY-O	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTL	0.7	0.6	0.8	0.8	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

DESCRIPTION

THE PROVISION OF ECONOMIC ADVISORY SERVICES TO CFS AND CLIENT AGENCIES.

TECHNOLOGY CENTRES POLICY (\$000)

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 1334 ECONOMIC ANALYSIS

2. FORESTRY CANADA PROGRAM : 1300/1330

3. PROJECT PROFILE : 1990/91

Project Leader : G.R. MILNE

Total A-Base P/Y's : 1.3

Total A-Base O&M : 8.5K

Total Other P/Y's : 0.3

Total Other O&M : 0.0

Strategic Forest Sector Issues: 3, 5, 7, 9

Studies:

3301 ECONOMIC RESEARCH OF THE PROVINCIAL FOREST INDUSTRY

Study Leader : PETER TRELAUNY

A-Base P/Y's : 0.8

A-Base O & M : 2.5K

Initiated : 1980

Other P/Y's : 0.0

Other O & M : 0.0

3302 NATIONAL FOREST ECONOMICS PROGRAM

Study Leader : G.R. MILNE

A-Base P/Y's : 0.2

A-Base O & M : 1.0K

Initiated : 1985

Other P/Y's : 0.0

Other O & M : 0.0

3303 ECONOMIC RESEARCH OF THE PROVINCIAL FOREST RESOURCE

Study Leader : G.R. MILNE

A-Base P/Y's : 0.3

A-Base O & M : 5.0K

Initiated : 1980

Other P/Y's : 0.3

Other O & M : 0.0

4. PROBLEM DEFINITION

1334 The forest resource contributes to the economic and social welfare of all Newfoundlanders through a number of forest functions including commercial timber and domestic fuelwood, watershed stability, provision of habitat for wildlife and recreation, and protection from wind. To assist government officials in allocating forest resources among competing uses, information is required on both the physical quantity and economic value of alternate forest functions. The forest industry is a vital sector of

the provincial economy, especially in rural areas where alternate sources of employment and income are limited. Federal and provincial government agencies require current information on the industry structure, conduct, and performance to assist in formulating policies related to industrial development. At the national level, the forest industry is a cornerstone of the economy and the largest net earner of foreign exchange. The limited number of economists in Forestry Canada means that national studies often require regional input and direct participation.

5. OBJECTIVES

a) Project Objectives

- 1334 The broad objective of this project is to improve the level of economic information on forest resource outputs and the forest industry for use in forest policy and analyses by government agencies related to forest land management and industrial development.

b) Study Objectives

- 3301 The objectives of this study are to 1) expand the data currently available on the province's forest industry to include comprehensive economic and sociological information through periodic sample and census surveys; 2) analyse the data to provide a more complete understanding of the harvesting and processing of wood fibre in Newfoundland; and 3) develop models to assess the effects of the forest industry on the provincial economy and linkages with other sectors.
- 3302 The objectives of this study are to provide regional support for the national program of economics research. Presently, the program consists of only one study on Canada's timber supply.
- 3303 The objective of this project is to improve the level of economic information on forest resource outputs and values for use in policy and analyses by government agencies responsible for forest land management.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 1334 This project was initiated in 1980. Preliminary surveys of the province's wood industry survey were conducted and reports published in the early 1980's. In 1986, a survey of the logging industry was conducted and a report published. From 1984 to 1987, alternate methods of valuing commercial timber were developed by one of the economists for a Ph.D. In 1988, surveys of the sawmill and planing mill, and converted wood products industries were conducted. Reports either have been, or are in the process of being published. For the NFEP, considerable input has been provided to the national timber supply study.

b) Project Highlights, 1989/90

- 1334 In 1989/90, considerable activity took place in this project. For the study of converted wood products, a Directory and economic report were published. With the sawmill study, data analysis and a draft report were completed. Also, a survey of lumber importers was conducted to provide additional data. Presentations of the sawmill study results were made at the CIF and NLPA annual meetings. For the NFEP, revisions to the Nfld. synopsis were made and several other provincial synopses' updated.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

- 3301 Trelawny P.M. 1989. The effects of introducing supplemental bovine somatotropin to the Canadian dairy industry. Canadian Journal of Agricultural Economics 37: 191-209.

ii) Information Reports:

- 3301 Trelawny, P.M. 1990. An analysis of the sawmill and planing mill industry of Newfoundland. Canada-Newfoundland Forest Resource Agreement Information Report (in press).

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

- 3301 Trelawny, P.M. 1989. The current status and future prospects of the sawmill and planing mill industry of Newfoundland. Paper presented to the annual meeting of the CIF's Newfoundland Section at Grand Falls, Nfld., November 10, 1989.
- Trelawny, P.M. 1990. An overview of the sawmill and planning mill industry of Newfoundland. Paper presented to the quarterly meeting of the NLPA at Lethbridge, Nfld. on February 10, 1990.
- Trelawny, P.M. 1990. Sawmill and planing mill industry of Newfoundland Seminar, NLR, ForCan, St. John's, Nfld., February 20, 1990.
- Trelawny, P.M. 1990. Sawmill and planing mill industry of Newfoundland Lecture, MUN.

- 3302 Milne, G.R. 1989. Canada's timber supply; current situation and future prospects. Seminar presented at the Dept. of Forestry and Natural Resources, Edinburgh University, April, 1989.
- 3303 Milne, G.R. 1989. The effect of institutional factors on forest policy and management. Lecture presented at the Dept. of Forestry and Natural Resources, Edinburgh University, April, 1989.

v) Other Technology Transfer:

Nil

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
3301	Conduct a census of lumber importers in the province	Conducted a census of the 77 firms which imported lumber into Nfld.	-Publish CIF proceedings on the sawmill industry of Newfoundland -Publish a summary report on the sawmill industry of Newfoundland -Complete a paper on the allocation of public timber in Newfoundland	-Resurvey the lumber and CWP industries of Newfoundland -Conduct a census of the importers of lumber in Newfoundland	Analyse the results of the surveys and census
	Undertake an analysis of the data and publish a report	Data was analysed and the results of the analysis were published in the sawmill report			
	Publish a directory and economic report on the CWP industry	Directory and economic report on the CWP industry were published	-Analyse the direct and indirect effects of forestry activity on the economy of Newfoundland		
3302	1. Finish draft of section in full report on emerging issues, problems and opportunities.	1. Completed	1. Complete the revision of all ten provincial synopses	No goals can be identified pending outcome of NPEP Task Force review and report to senior management	
		2. Completed, and revised again from data provided in the DFA 20 year plan	2. Review the entire report on timber supply and edit as needed		

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	2. Circulate Mfld. synopsis to the Province for comments, and revise	3. Eight provinces done and sent to study leader. Final two require information from the respective governments	3. Contribute to review of NFSP as member of national Task Force		
	3. Review, update, and edit the ten provincial synopses of timber supply	4. None requested			
	4. provide input to Phase II as needed				
3303	1. Provide input to Provincial timber supply work as required	1. None requested	1. Publish Aphid paper	1. Initiate study on key non-timber values in Mfld.	1. Complete study on non-timber values and publish reports
	2. Revise paper on aphid economics for publication	2. Paper revised but will be submitted for publication in 1990/91	2. Initiate contract study of Mfld. X-mas tree market and publish an information report with contractor		
3303	3. Begin initial planning for R&D on non-timber values	3. Reference lists built-up relating to wildlife and recreation values	3. Present invited paper on sustainable development in Ontario		

8. LONG TERM PROJECTIONS

- 1334 Over the next few years, increased activity in forest resources research will occur, particularly in the areas of non-timber valuation, the economic effects of timber harvesting on the forest environment, and costs/benefits of forest protection. With forest industry research, the input-output modelling study will be continued and the development of a general equilibrium model explored. Input to the NFEP will continue.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 1334 Major cooperators and client agencies include the Provincial department of Forestry and Agriculture, the local forest industry and NLPA, and Memorial University. Future work in forest resources research will expand this group to include Provincial Wildlife/Recreation agencies.

10. EVALUATIONS

- 1334 This project is not normally included in the Department's review process.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/33 [RR/PP]
 TITLE: ECONOMIC ANALYSIS
 RESP. CENTRE: 4111 LEADER: MILNE, G.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 1334
 EVALUATION-PREV: 00/00 NEXT: 02/89

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$63.6	\$66.9	\$57.4	\$60.2	\$10.0	\$0.0	\$0.0
O&M	\$5.6	\$4.0	\$4.0	\$6.5	\$6.5	\$10.0	\$10.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$5.6	\$4.0	\$4.0	\$6.5	\$6.5	\$10.0	\$10.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$69.2	\$70.9	\$61.4	\$66.7	\$16.5	\$10.0	\$10.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.5	1.4	1.2	1.2	0.2	1.4	1.4
PY-O	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTL	0.5	1.4	1.2	1.2	0.2	1.4	1.4

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 THE PROVISION OF ECONOMICS ADVISORY SERVICES TO CFS AND CLIENT AGENCIES.
 UNDERTAKING RESEARCH STUDIES IN FOREST ECONOMICS DIRECTED TOWARDS SPECIFIC
 RESOURCE AND INDUSTRY PROBLEMS AND OPPORTUNITIES.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	



2000 - RESEARCH AND TECHNICAL SERVICES



FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2111 PROGRAM MANAGEMENT - RESEARCH AND TECHNICAL SERVICES

2. FORESTRY CANADA PROGRAM : 2100/2110

3. PROJECT PROFILE : 1990/91

Project Leader : R.S. VAN NOSTRAND AND J. HUDAK

Total A-Base P/Y's : 2.0

Total A-Base O&M : 144.8K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

4. PROBLEM DEFINITION

The Research and Technical Services program of the NLR includes a range of investigations in subject areas such as reforestation, growth and yield, forest ecology, environmental concerns in forestry, biometeorology, biological control of forest pests, and surveys to detect forest, insects and diseases. These subject areas have been grouped into two principal categories - Forest Resources and Environmental Research (FRER) and Forest Protection Research (FPR), and a Program Director manages each of the programs.

5. OBJECTIVES

a) Project Objectives

To ensure effective management of personnel and financial resources allocated to research programs, and to maintain scientific and technology transfer elements of programs at a high level.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Management of the Research and Technical Services activity by the two principal components of FRER and FPR has been part of the organizational framework of NLR for more than a decade. Significant progress has been made in research on reforestation, tree genetics, growth and yield,

environmental effects of forestry practices, forest ecology, biometeorology, and energy forests, in the annual detection and forecasts of major forest pests and the basic biology of these pests, in the quantification of their impact on forest stands and in the development of effective control measures, including alternatives to chemicals. Research efforts on B.t. were effective in securing the registration of this product for aerial application against the hemlock looper.

b) Project Highlights, 1989/90

The Strategic Plan for NLR was presented to NEWFRAC for review and approval. The Pest Biology Project of the Forest Protection Research Program was formally reviewed by an external review panel.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

During August, the IUFRO Working Party on Northern Forest Silviculture and Management met for a week in central Newfoundland to discuss Silvics and Ecology of Boreal Spruces. The seminars and field trips attracted 75 participants from Europe and North America who were extremely positive about the benefits of the meeting and the post conference tours to western Newfoundland and Labrador.

Forest Protection staff participated in the organization of the Annual Meeting of the Entomological Society of Canada and hosted a post conference field trip highlighting forest insect problems across the Island.

GOALS VS. ACHIEVEMENTS 1989/90		3 YEA STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	Continue management and leadership responsibility for the research program and develop a 5-year strategic plan for the Centre.	Completed strategic plan.	Continue management and leadership responsibilities for the Centre.	Continue management and leadership responsibilities for the Centre.	Continue management and leadership responsibilities for the Centre.

8. LONG TERM PROJECTIONS

The Centre will maintain the present management structure and managers will endeavour to increase cooperation with client agency to better address their requirements, and at the same time adhere to the strategic plan of Forestry Canada.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Cooperation is maintained with the Department of Forestry and Agriculture and the two pulp and paper companies in regeneration, tree growth, energy biomass development research, and forest protection research and surveys. The Department of Forestry and Agriculture are close cooperators in damage assessment surveys on a work and cost-sharing basis. DF&L, EPS, and ForCan are cooperators in environmental screening of resource roads and silviculture proposals funded by the GDA (Forestry). Financial and research support for projects at the Chemical and Physical Analyses Laboratory come from DOE (Provincial), EPS, and MUN: reciprocal advisory services are provided by ForCan. The provincial Department of Mines and Energy, EMR, Department of Forestry and Agriculture, and ForCan maintain close liaison through various working groups. Other cooperating agencies are NRC, Lands Directorate (DOE), Newfoundland Wildlife Service, federal and provincial departments of Agriculture, and the City of St. John's.

10. EVALUATIONS

No formal evaluation, but the research program generally is scrutinized annually by senior management at headquarters through the published program plan, and periodic visits to NLR.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/48 [RR/PP]
 TITLE: PROGRAM MANAGEMENT
 RESP. CENTRE: 4162 LEADER: VAN NOSTRAND, R.S.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2111
 EVALUATION-PREV: 00/00 NEXT: /

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$11.9	\$100.6	\$50.3	\$56.7	\$56.7	\$0.0	\$0.0
O&M	\$72.6	\$56.9	\$56.9	\$65.0	\$100.0	\$100.0	\$100.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$72.6	\$56.9	\$56.9	\$65.0	\$100.0	\$100.0	\$100.0
CAP	\$0.0	\$0.0	\$0.0	\$25.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$84.5	\$157.5	\$107.2	\$146.7	\$156.7	\$100.0	\$100.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.5	1.0	1.0	1.0	1.0	1.0	1.0
PY-O	1.0	1.0	0.0	0.0	0.0	0.0	0.0
TOTL	1.5	2.0	1.0	1.0	1.0	1.0	1.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 PROJECT TO ENSURE EFFECTIVE MANAGEMENT OF HUMAN AND FINANCIAL RESOURCES ALLOCATED TO FRER PROGRAM AND TO MAINTAIN SCIENTIFIC AND TECHNOLOGY TRANSFER ELEMENTS OF PROJECTS AT A HIGH LEVEL.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADA

INTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/46 [RR/PP]
TITLE: PROGRAM MANAGEMENT
RESP. CENTRE: 4161 LEADER: HUDAK, J.
PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2111
EVALUATION-PREV: 03/83 NEXT: 02/94

	1988-89	1989-90	1990-91			
	ACTUAL	BUDGET	REVISED	UPCOMING	PLANNING	PLANNING
	31/03/89	01/04/89	01/04/89	00/00/00	YEAR 1	YEAR 2
					YEAR 3	

FINANCIAL RESOURCES (\$000)						
SAL	\$71.1	\$50.3	\$50.3	\$56.7	\$0.0	\$0.0
O&M	\$95.5	\$65.0	\$65.0	\$79.8	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$95.5	\$65.0	\$65.0	\$79.8	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$108.8	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$166.6	\$115.3	\$115.3	\$245.3	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER						
PY-P	0.5	0.0	1.0	1.0	0.0	0.0
PY-O	1.0	1.0	0.0	0.0	0.0	0.0
TOTL	1.5	1.0	1.0	1.0	0.0	0.0

COOPERATORS RESOURCES (\$000)						
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
OVERALL MANAGEMENT OF FOREST PROTECTION RESEARCH PROGRAM OF THE NEWFOUNDLAND FORESTRY CENTRE.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2211 ENVIRONMENTAL EFFECTS OF FORESTRY PRACTICES

2. FORESTRY CANADA PROGRAM : 2200/2211

3. PROJECT PROFILE : 1990/91

Project Leader : I.D. THOMPSON
Total A-Base P/Y's : 2.5
Total A-Base O&M : 11.0K

Total Other P/Y's : 0.0
Total Other O&M : 1.5K (ENFOR)

Strategic Forest Sector Issues: 1, 5

Studies:

4202 SERVICES TO OTHER AGENCIES

Study Leader : I.D. THOMPSON
A-Base P/Y's : 0.1
A-Base O & M : 0.5K
Initiated : 1986

Other P/Y's : 0.0
Other O & M : 0.0

4204 IMPACT OF FORESTRY PRACTICES ON WILDLIFE

Study Leader : I.D. THOMPSON
A-Base P/Y's : 1.4
A-Base O & M : 6.5K
Initiated : 1987

Other P/Y's : 0.0
Other O & M : 0.0

4205 EFFECTS OF MOOSE BROWSING ON SECOND GROWTH FOREST

Study Closed

4206 ENVIRONMENTAL IMPACT OF WHOLE TREE HARVESTING

Study Leader : BRUCE A ROBERTS
A-Base P/Y's : 0.5
A-Base O & M : 1.0K
Initiated : 1989

Other P/Y's : 0.0
Other O & M : 1.5K (ENFOR)

4207 ASSESSMENT OF MARTEN HABITAT

Study Leader : I.D. THOMPSON
A-Base P/Y's : 0.5
A-Base O & M : 3.0
Initiated : 1990

Other P/Y's : 0.0
Other O & M : 0.0

4. PROBLEM DEFINITION

- 2211 Integrated resource management has become an important feature of forest planning in Canada. Studies of forest/wildlife interactions are an integral part in improving the ability of management agencies and industry to manage for 'other resources'. Habitat for wildlife is altered through logging with improvements for some species and losses for others. Some wildlife species may alter forest structure through herbivory and result in important consequences for long-term management planning. The need exists to examine the inter-relationships between forestry management practices and production of wildlife on forest lands in order to preserve biodiversity.

Forest harvesting may also alter soil nutrient regimes by removal of nutrients comprising wood fiber. This may be particularly true of white birch stands owing to the longevity of the tree, density of the wood, and second-growth nature of the stand.

5. OBJECTIVES

a) Project Objectives

- 2211
1. To assess the carrying capacity of logged forests for wildlife species.
 2. To provide guidelines for multiple use forestry.
 3. To assess the suitability of second forest growth for wildlife.
 4. To assess the physical, nutritional, and chemical changes to soil and vegetation on imperfectly drained sites following harvesting of white birch stands.
 5. To provide guidelines for multiple use forestry.
 6. To provide advice to other agencies and industry as requested.

b) Study Objectives

- 4202
1. To provide advice to client agencies as requested.
 2. To serve on environmental assessment committees as needed.
 3. Represent Canada to IUGB at meetings.
 4. Prepare two papers on the effects of timber-harvesting on marten.
 5. Testify at the Ontario timber EA hearings when called.
- 4204
1. To quantify moose habitat at the SW Gander study area.
 2. To develop a carrying capacity model for moose.
 3. To provide guidelines for the enhancement of moose habitat through the forest management process.
- 4205
1. To determine the effects of moose browsing on PCT stands.
 2. To provide guidelines to minimize the impacts of moose browsing in PCT stands.
 3. To determine the effects of moose browsing on second forest growth.
- 4206 The overall objective is to assess the physical, nutritional and chemical changes to soil water and vegetation on three different quality white birch sites following harvesting in central Newfoundland.

- 4207 1. To determine the value of second forest growth, both natural and in PCT stands, to marten as future habitat.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2211 Integrated forest management, which includes the establishment of objectives for wildlife, recreation, site condition, and fisheries as well as timber production, is becoming increasingly important as the public demands improved environmental management. There is a need to assess the impact of timber harvesting and silviculture on wildlife species, and on entire ecosystems. Integrated resource management is an area in which the federal government must show leadership in researching techniques, and to maintain and foster expertise. The Standing Committee on Forestry and the Environment has recommended that Forestry Canada take a leading role in IRM in Canada.

b) Project Highlights, 1989/90

- 2211 Studies on the effects of moose browsing in pre-commercially thinned stands was completed in 1989-90, including several journal articles and an information report with management objectives.

Committee involvement: Little-Grand Lake timber harvesting assessment.

Consulting: Ontario Ministry Natural Resources, New Brunswick DNR.

Canadian Liaison Officer to International Union of Game Biologists.

Carrying capacity work is continuing at the Southwest Gander study area. A new study on the value of second-growth forest and PCT stands to the endangered Newfoundland marten was begun. Four publications were completed or are in preparation.

The white birch study plots were measured for the first time.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

- 4202 Thompson, I.D. 1989. Use of track transects to measure the relative occurrence of some boreal mammals in uncut forest and regeneration stands. Can. Jour. Zool. 67:1816-1823.
- 4204 Thompson, I.D. 1989. Balsam fir and carrying capacity for moose in Newfoundland. Trans 21st IUGB Congress, Trondheim.
- 4205 Thompson, I.D., and A.U. Mallik. 1989. Moose browsing and the allelopathic effects of *Kalmia angustifolia* on balsam fir regeneration in central Newfoundland. Can. Jour, Forest Res. 19: 524-526.

Thompson, I.D., R.E. McQueen, P.B. Reichardt, D.G. Trenholm, and W.J. Curran. 1989. factors influencing choice of balsam fir twigs from thinned and unthinned stands by moose. *Oecologia* 81: 506-509.

ii) Information Reports:

- 4205 Thompson, I.D. and W.J. Curran. 1989. Moose damage to pre-commercially thinned balsam fir stands: review of research and management implications. Information report N-X-272.

iii) Other Reports:

- 4202 Thompson, I.D. 1989. A forestry/wildlife policy for Canada. Discussion paper, prepared October 1.
- 4206 Roberts, B.A. 1989 contract specifications of DSS contract 4Y125-9-1119/01 XAQ. Forestry Canada File 6638-4-3. The impact of whole tree and conventional harvesting of white birch for fuelwood
- Roberts, B.A. 1989 contract specifications, location and extent of study sites. Report to H. Taylor Abitibi-Price, Grand Falls, Nfld.

iv) Lectures, Seminars, and Scientific Addresses:

- 4202 Thompson, I.D. 1989. The role of the wildlife biologist in the management of natural resources. Lecture to Memorial Univ. Biology course.
- Thompson, I.D. 1989. The effects of timber-harvesting on marten in Canada. Lecture to Swedish Univ. of Agric. and Forestry, Umea.
- 4204 Thompson, I.D. 1989. A possible error in the calculation of carrying for large ungulates. Paper to the 21st IUGB conference, Trondheim Norway.
- Same paper to the Swedish Univ. Agric and Forestry.
- 4205 Thompson, I.D. 1989. Influence of moose on second forest growth in Newfoundland. Paper to the 25th North American Moose Conference, St. John's, Newf.

v) Other Technology Transfer:

Nil

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4202	1. Represent FC as required. 2. Advice to gov'ts as required.	1. Acted on 2 EA committees; attended IUGB meeting Trondheim, Norway; wrote For./wildl. policy 2. Advised N.B. on forest/wildl. issue advised FC Maritimes on IHM funding advised Que. Dept. For. forestry/wildlife	1. To represent FC as required. 2. To provide advice to agencies as requested. 3. To submit one paper on the effects of logging on marten.	1. To represent FC as required. 2. To provide advice to agencies as requested.	
	3. Submit paper on marten food.	3. Paper accepted journal.	4. To submit 1 paper on IHM.		
	4. Submit paper effects of logging on marten.	4. Paper submitted to journal.	5. To present 1 conference paper on IHM.		
4204	1. Describe herb biomass in Bw/alder.	1. Complete.	1. Measure herbaceous production on landing areas.	1. Measure aquatic food.	1. Prepare 2 journal publications.
	2. Measure density Fb/Sb stands.	2. Not done - no snow for winter work	2. Measure density in fb/sb stands.	2. Complete model.	
	3. Measure Bw leaf production.	3. Complete.			
		4. Not done.			

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4205	4. Measure browse in Fb types.	- no snow for winter work	3. Measure browse in Bw types.		
	5. Measure browse in Bw types	5. Not done - no snow for winter work	4. Measure browse in Fb types.		
	6. Measure density roadside Bw.	6. Complete.	5. Continue to input data on ARCINFO.		
	1. Present conference paper.	1. Complete.	1. Complete journal paper on moose browsing effects on second forest growth.		
	2. Prepare information report	2. Complete.	2. Close study.		
4206	1. Establish 9 one ha experimental blocks a. Inventory biomass b. Inventory understory vegetation	1. Experimental blocks established. a. Biomass inventory completed. b. Understory inventory completed.	1. Install remaining porus cup lysimeters. 2. Install fritted glass lysimeters.	Continue # 3,4,5	Continue # 3,4,5

GOALS VS. ACHIEVEMENTS 1989/90				3 YEAR STUDY GOALS	
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4207	c. Inventory soil humus	c. Soil humus inventory completed.	3. Collect leachate every 2 weeks		
	d. Install porous cup lysimeters	d. About 1/2 porous cup lysimeters installed.	4. Set up seepage collection		
			5. Set up throughfall collection, and litterfall traps.		
	1. To measure 15 habitat variables in 2 stands of 3 stand types.		1. To complete a paper on marten habitat in Newfoundland.		
	2. To measure food availability in 2 stands of 3 stand types.				
	3. To estimate the amount of marten habitat in Newfoundland and its lifespan.				

8. LONG TERM PROJECTIONS

- 2211 Integrated forest management is an important area as old-growth forests are depleted and public recognition that forests supply more than fibre. Level of commitment within Forestry Canada to IRM will be dependent on the commitment of government and industry to the protection and enhancement of forest wildlife, recreation, and to the preservation of representative areas of ecosystems. Advancement of research at the federal level is also contingent on the development of a national policy for forestry/wildlife issues, a commitment to improve our capability to solve problems in this area, and adherence to the recommendations of the Brundtland Commission, and the World Conservation Strategy.

In Newfoundland, future work should focus on the quantification and projection of habitat availability for wildlife species, particularly those species associated with mature forests. Research into habitat effectiveness indices, the value of riparian areas to wildlife and fisheries, habitat supply, autecological research of forest-dwelling species are areas for future study and maintenance of biodiversity.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2211 Newfoundland Department of Forestry, Wildlife Division, Department of Environment and Lands, National Wildlife Organizations, industry, scientific community.

10. EVALUATIONS

- 2211 Formal project review was conducted in 1988.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/42 [RR/PP]
 TITLE: ENVRMNTL. EFFECTS OF FORESTRY PRACTICES
 RESP. CENTRE: 4162 LEADER: THOMPSON, I.D.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2211
 EVALUATION-PREV: 00/00 NEXT: /

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)

SAL	\$80.3	\$84.7	\$127.3	\$132.4	\$0.0	\$0.0	\$0.0
O&M	\$11.1	\$8.0	\$8.0	\$14.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$11.1	\$8.0	\$8.0	\$14.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$91.4	\$92.7	\$135.3	\$146.4	\$0.0	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER

PY-P	1.0	1.0	1.3	1.3	0.0	0.0	0.0
PY-O	1.0	1.0	1.8	1.8	0.0	0.0	0.0
TOTL	2.0	2.0	3.1	3.1	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

DESCRIPTION

PROJECT TO RESEARCH AND EVALUATE THE ENVIRONMENTAL EFFECTS OF FORESTRY PRACTICES AND TO ESTABLISH MITIGATIVE GUIDELINES AND PRESCRIPTIONS.

TECHNOLOGY CENTRES POLICY (\$000)

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2213 ENVIRONMENTAL INFLUENCES ON FOREST GROWTH

2. FORESTRY CANADA PROGRAM : 2200/2210

3. PROJECT PROFILE : 1990/91

Project Leader : A. ROBERTSON
Total A-Base P/Y's : 1.7
Total A-Base O&M : 7.0K

Total Other P/Y's : 0.0
Total Other O&M : 2.5K (ENFOR)

Strategic Forest Sector Issues:

Studies:

2501 BIOMETEOROLOGY RESEARCH

Study Leader : A. ROBERTSON
A-Base P/Y's : 0.9
A-Base O & M : 3.0K
Initiated : 1987

Other P/Y's : 0.0
Other O & M : 0.0

2502 WIND EFFECTS ON FORESTS

Study Leader : A. ROBERTSON
A-Base P/Y's : 0.5
A-Base O & M : 2.0K
Initiated : 1987

Other P/Y's : 0.0
Other O & M : 0.0

2503 BIOENERGY RESEARCH

Study Leader : A. ROBERTSON
A-Base P/Y's : 0.1
A-Base O & M : 0.0K
Initiated : 1979

Other P/Y's : 0.0
Other O & M : 2.5K (ENFOR)

2504 IMPACT OF CLIMATE CHANGE ON FORESTS

Study Leader : A. ROBERTSON
A-Base P/Y's : 0.2
A-Base O & M : 2.0K
Initiated : 1990

Other P/Y's : 0.0
Other O & M : 0.0

4. PROBLEM DEFINITION

High investments in silviculture and fire and pest control are being made to increase forest productivity in Newfoundland. There is a poor understanding of how climate and weather affects the outcome of these investments and of forests

in general. Therefore, in the context of forest meteorology and climatology, there is a research requirement to investigate the negative and positive aspects of major climatic and weather effects on Newfoundland forests and to develop silvicultural strategies, including the establishment of demonstration plantations and cutting patterns.

There is universal concern about the effect 'greenhouse' gases will have in accelerating climate change. Some scientists expect these changes to be rapid and will have profound environmental effects on society.

Presently, knowledge of how rapid climate change may affect forestry is poor. To assist governments, industry and the public to understand the issues and develop a rational policy to deal with both positive and negative aspects of a comprehensive knowledge of the issues and technology trends is essential.

Changes in the quantitative and qualitative aspects of soil is largely a function of climate. Therefore, soil is a major environmental influence that affects every facet of forestry; not only the productivity of forests, but also the economics of harvesting the resource and silvicultural operations. Despite its importance, knowledge of the taxonomy and dynamics of Newfoundland soils is seriously lacking. Consequently, there is an urgent need to assess the nature of Newfoundland soils and its impact on forest dynamics (especially following disturbance by logging, fire, windthrow, and insect and disease infestations) and to develop land capability guidelines.

5. OBJECTIVES

a) Project Objectives

- 2213 To conduct four studies relating to environmental influences on forest distribution and growth, including:
1. Biometeorological research - aimed at quantifying the energy fluxes in forest ecosystems to determine theoretical and potential production;
 2. Wind research - concentrating on the effects of wind on the chronosequence of natural forests and plantations, and applying knowledge of aerodynamics in forests and effects on wood quality experiments and wind hazard classification of micro- and macro-productivity zones to enhance forest management;
 3. Bioenergy research - to determine the feasibility of utilizing biomass for energy production in Newfoundland and various silvicultural options and assisting Federal and Provincial governments to develop long-term and short term strategies for utilization of biomass energy;
 4. Climate change - reviewing the impact of climate change on forests in accordance with Forestry Canada's Strategy for Research on Climate Change.

b) Study Objectives

- 2501 Determine the potential and theoretical maximum production of forests and plantations by:
1. measuring the energy balance of forest cutovers and short rotation plantations;
 2. determine forest design criteria to increase storage of energy in biomass;
 3. extrapolating energy balance data and standard meteorological data to produce regional maps estimating potential production based on energy budget analysis.
- 2502 Publish results of a major study on the impact of wind on forests in Newfoundland; study aeromechanical and biomechanical characteristics of forests.
- 2503 Analyze data and publish results of short rotation plantation trials.
- 2504 Implement Forestry Canada's Strategic Plan for Research on Climate Change at the regional level by:
- Assessing potential impact of climate change on Newfoundland forestry; represent NLR on Forestry Canada Working Group on Climate Change to assist governments in developing policies relating to the climate change issue; publish articles on the impact of climate change from a Newfoundland perspective.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2213 It is generally recognized that forest climatology has received very little attention beyond its importance in forest fire control. However, concerns about global climate change and its possible impact on the future of society has added impetus to the need for a better understanding of climate impact on forests. This project is a consolidation of somewhat fragmented studies on forest development which provides a better focus on major climatic effects on forest development and the investigation of new silvicultural options, especially those which take climate change into account.

b) Project Highlights, 1989/90

- 2213 The first studies on the energy balance of forest cutovers and planting sites was initiated in 1985; short rotation energy plantation research based on Salix coppice was initiated in 1979; a major study on the impact of wind on forests, using many novel analytical and statistical methods, was initiated in 1985; in accordance with Forestry Canada's Strategy for Research on Climate Change was initiated in 1989. Numerous publications and presentations have emanated from these initiatives.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

2501 McCaughey, J. and A. Robertson 1989. An energy balance measuring system for hydrologic studies in remote areas. Canadian Society of Civil Engineering. Proceedings Annual Conference and 9th Canadian Hydrological Conference Vol. IIA, pp. 317-331, St. John's.

2502 Robertson, A. 1989 Tré og vindur. Arsiti Skograekterfelags Islands. Reykjavik, Iceland.

2503 Robertson, A. Energy forest R&D in Newfoundland 1981-88. Proc. 7th Bioenergy Seminar, April 24-26, National Research Council, Ottawa.

iv) Lectures, Seminars, and Scientific Addresses:

2501 Robertson, A. Tropical Forests: A Global Demise. Newfoundland Museum, St. John's. May 18, 1989.

v) Other Technology Transfer:

Nil

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2501	Measure energy fluxes at St. Georges, Black Duck and Gunnersholt (Iceland)	Completed as planned	Measure energy fluxes at St. Georges, Black Duck, Gunnersholt (Iceland), Study light use efficiency at Pasadena. Analyze data and publish results as they become available.	Continue experiments at St. Georges, Black Duck, Gunnersholt and Pasadena. Analyze data and publish results as soon as possible.	Repeat
2502	Conduct a major study on the impact of wind on forests; publish results of experiments on the effects of wind on trees.	Two thesis and numerous journal articles summarized results of research.	Continue investigations on effects of wind on trees and develop wind hazard rating systems.	Continue, publish journal papers currently in review process.	Continue as above
2503	Analyze x-ray densitometric data on balsam fir trees, analyze growth and yield data of short-rotation plantations.	Papers on wood quality and x-ray densitometry submitted for journal review.	With an A-base budget of \$0.0 it is not realistic to set goals.	As above	As above

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2504	Participate in Forestry Canada Working Group on Climate Change to develop policies, strategies and research relating to climate change impact on forestry.	Forestry Canada Strategic Plan for Research on Climate Change document completed; a major workshop on Climate and Weather in Newfoundland was organized in St. John's.	Develop and initiated plan for research on the impact of climate change on forestry in accordance with Forestry Canada's Strategic Plan.	Continue work with research plan initiatives publish articles and assessments on sensitivity of Newfoundland forests to climate change.	Continue as above

8. LONG TERM PROJECTIONS

- 2213 Conduct biometeorological, wind, bioenergy and climate change research as outlined in the above objectives:

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2213 Dr. J. McCaughey, Queen's University, Kingston.
Research Branch, Icelandic Forest Service
Icelandic Soil Conservation Service
Dept. Forestry and Agriculture
Faculty of Engineering and Applied Science, Memorial University
Atmospheric Environment Service
Northern Forest Research Station, Forestry Commission (UK)
University College of North Wales
Oxford Forestry Institute, University of Oxford
Agriculture Canada, Mt. Pearl
Forestry Canada Working Group on Climate Change

10. EVALUATIONS

This project will be evaluated in 1990/91 under the department's peer review process.

11. RESOURCE ALLOCATION

Refer to next page.

PROJECT #: 01/25 [RR/PP]
 TITLE: ENVIRONMENTAL INFLUENCES ON FOREST GRTH
 RESP. CENTRE: 4162 LEADER: ROBERTSON, A.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 2223
 EVALUATION-PREV: / NEXT: /

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISÉ 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$96.2	\$109.8	\$74.4	\$79.5	\$0.0	\$0.0	\$0.0
O&M	\$10.5	\$11.5	\$11.5	\$7.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$10.5	\$11.5	\$11.5	\$7.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$106.7	\$121.3	\$85.9	\$86.5	\$0.0	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	1.5	1.5	1.0	1.0	0.0	0.0	0.0
PY-O	1.0	1.0	0.7	0.7	0.0	0.0	0.0
TOTL	2.5	2.5	1.7	1.7	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO ASSESS ENVIRONMENTAL INFLUENCES ON FOREST DISTRIBUTION AND GROWTH.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2214 FOREST AND PLANT ECOLOGY

2. FORESTRY CANADA PROGRAM : 2200/2210

3. PROJECT PROFILE : 1990/91

Project Leader : BILL MEADES

Total A-Base P/Y's : 5.4

Total A-Base O&M : 19K

Total Other P/Y's : 0.2

Total Other O&M : 2.0K (ENFOR)

Strategic Forest Sector Issues: 1,4,5

Studies:

4301 ECOLOGICAL INVESTIGATIONS OF WETLANDS FOR FORESTRY

Study Leader : E. DOYLE WELLS & S. MORGAN

A-Base P/Y's : 1.9

A-Base O & M : 5.0K

Initiated : 1985

Other P/Y's : 0.0

Other O & M : 0.0

4302 ECOLOGICAL INVESTIGATIONS OF HEATHLANDS

Study Leader : BILL MEADES, R. VAN KESTEREN AND D.B. PIKE

A-Base P/Y's : 0.5

A-Base O & M : 1.0K

Initiated : 1985

Other P/Y's : 0.0

Other O & M : 0.0

4303 FOREST CLASSIFICATION AND ECOLOGY

Study Leader : BILL MEADES, R. VAN KESTEREN AND D.B. PIKE

A-Base P/Y's : 1.5

A-Base O & M : 4.0K

Initiated : 1986

Other P/Y's : 0.0

Other O & M : 0.0

4304 THE GROWTH CHARACTERISTICS AND ECOLOGY OF LARCH, WHITE SPRUCE AND RED PINE IN NEWFOUNDLAND

Study Leader : BRUCE A. ROBERTS

A-Base P/Y's : 0.2

A-Base O & M : 2.0K

Initiated : 1980

Other P/Y's : 0.0

Other O & M : 0.0

4305 SOIL CHEMICAL AND PHYSICAL PROPERTIES AND THEIR RELATION TO FOREST GROWTH AND NUTRITION

Study Leader : BRUCE A. ROBERTS

A-Base P/Y's : 0.3

A-Base O & M : 4.0K

Initiated : 1980

Other P/Y's : 0.0

Other O & M : 0.0

4306 CALIBRATING THE FORCYTE MODEL FOR NEWFOUNDLAND

Study Leader : W.J. MEADES AND D.B. PIKE
 A-Base P/Y's : 0.3 Other P/Y's : 0.2
 A-Base O & M : 1.0K Other O & M : 2.0K (ENFOR)
 Initiated : 1983

4307 SENSITIVITY OF LAND TO FOREST HARVESTING

Study Leader : A.R. VAN KESTEREN
 A-Base P/Y's : 0.7 Other P/Y's : 0.0
 A-Base O & M : 2.0K Other O & M : 0.0
 Initiated : 1990

4. PROBLEM DEFINITION

In Newfoundland and Labrador there is considerable variation in the structure, species composition and productivity of the forest landscape related to regional climate, land forms, and disturbance history. Forest management decisions concerning future wood supply, vegetation management and silvicultural prescriptions require knowledge of successional trends in forest vegetation following natural and man-made disturbance. Also, baseline data on forest vegetation is prerequisite to predicting possible impacts of forestry practices, including harvesting and silviculture on non-industrial forest users.

Peatlands in Newfoundland cover about 20% of the island and are naturally devoid of forest cover in this region. Research is being conducted to develop a better understanding of ecological factors limiting tree growth on bog and fen habitats in order to evaluate the biological feasibility of peatland afforestation.

5. OBJECTIVES

a) Project Objectives

1. Developing intensive baseline data on the vegetation and edaphic conditions characteristic of forest, heath and peatland habitats, both before and after natural and human disturbance.
2. Developing a better understanding of habitat limitations to tree growth with a view to silvicultural improvement.
3. Cooperation with industry and government agencies in the application of forest and land classification technology to forest management decisions.

b) Study Objectives

- a) to determine the effects of ditch spacing, fertilization, and surface preparation on the establishment and early growth of black spruce and eastern larch trees planted on peatlands;

- b) to determine the effects of refertilization on the growth of trees (lodgepole pine, Japanese larch, white spruce and black spruce) planted on ditched peatlands in the late 1960's and early 1970's;
 - c) to investigate processes of soil mineralization, respiration and anaerobiosis in ditched and fertilized peatland forestry sites and the effects on tree growth;
 - d) to determine, through species trials, the most appropriate species for planting on drained peatlands.
- 4302 To determine to what extent seed dispersal seedbed conditions, advance regeneration, and ericaceous shrub competition control regeneration of Black Spruce-Moss forest after cutting.
- 4303 To apply forest site classification and succession research to forest management decision making. To develop a better understanding of vegetation succession patterns after cutting. To investigate the application of ecological site classification and succession models to GIS technology.
- 4304 To study the ecology and distribution of selected major trees, shrubs and related plants to assess their potential for forest renewal under a variety of site conditions.
- 4305 To study the ecology of Newfoundland soils with emphasis on their physical and chemical characteristics in order to assess site and potential productivity.
- 4306 To obtain required empirical data necessary to calibrate FORCYTE models (10 and 11) for 3 levels of site quality in W. Newfoundland. Evaluate the models potential application to forest management in Newfoundland. Contribute to a national evaluation of FORCYTE-11.
- 4307
1. Development and testing of land sensitivity and terrain mapping systems using principles of landscape ecology and geomorphic processes.
 2. Characterization of the types, extents and intensities of ground disturbance associated with differing logging practices and landscape conditions.
 3. Proposing guidelines for the reduction of adverse site disturbances from logging and related activities.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2214 Studies in forest and plant ecology have played an integral part of the FORCAN, N & L REGION program from its inception. Between 1955-75 emphasis was placed on the development of vegetation classifications for forest, heath and peatland habitats that integrated vegetation types, soil and landform characteristics.

Over this period this project has been recognized as a centre of vegetation expertise in this region. Study leaders in this project have authored book chapters and journal articles on peatland, heathlands, and serpentine vegetation. Membership has been maintained on CCELC national committees (WETLANDS, ECOREGIONS and VEGETATION). Researchers also provide membership and technical advice to local federal and provincial government departments and private agencies on request.

This year 2 studies have been added to this project: Study 4305, formerly Study 2503, and Study 4306 (FORCYTE), formerly Study 3403. In addition, Study 4307 has been created to place increased emphasis on harvesting sensitivity investigations. This work was previously covered under 4303.

b) Project Highlights, 1989/90

- 2214 A Forest Classification Manual was completed in cooperation with the Newfoundland Department of Forestry and Agriculture under the FRDA agreement. Eco-Climatic Regions of Canada, to which this project contributed the Newfoundland and Labrador component, was published. A poster and abstract was presented to the 32nd IAVS symposium, Uppsala, Sweden. A 70K/UPI contract on site classification of cutovers in central Newfoundland was completed. A poster on white spruce was presented to the AIBS/CBA meeting and IUFRO WP S.05-12. An information report on Red Pine seed production was published.

A paper "Effects of fertilization on an 18-year old Japanese Larch peatland plantation in western Newfoundland Canada" was presented at "PEAT and PEATLANDS" symposium, Quebec City, August 7-10, 1989. A poster on "Early growth of black spruce trees planted on peatlands in central Newfoundland" was presented at FOREST RESEARCH MARKETPLACE, Toronto, November, 21-23, 1989. A field trip was hosted for a visiting scientist from the British Forestry Commission. A course in SILVICS and DENDROLOGY was offered at Memorial University, fall semester, 1989.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

- 4304 Roberts, B.A. 1989. The origin and development of white spruce, *Picea glauca* forest stands in central Newfoundland. *Amer. J. Bot.* 76:138.

ii) Information Reports:

- 4304 Roberts, B.A. 1989. Natural reproduction of red pine *Pinus resinosa* Ait in Newfoundland. Forestry Canada, Newfoundland and Labrador Region. Inf. Rept. N-X-273, 36 p.

iii) Other Reports:

- 4301 Symposium & Conference Papers / Posters
 Etat de la sylviculture des Tourbieres Neuve (Status of peatland forestry in Newfoundland). Proc of Conference on Forest Drainage, Sainte-Foy, 10 & 11 Septembre, 1985, pp 85-111.
 Effects of refertilization of an 18-year old Japanese Larch *Larix leptolepis* peatland plantation in western Newfoundland. Proc.
 "Peat and Peatlands Symposium '89", August 6-10, 1989, Quebec City, (In Print).
 Poster presented at "Marketplace", Toronto, November 21-23, 1989:
 "Early growth of black spruce trees planted on peatlands in Nfld."
- 4302 Meades, W.J. 1989. Recent Tree-line Drop In Eastern Newfoundland. pp. 264-267. [In] MacIver, D.C., R.B. Street and A.N. Auclair Eds. Climate Applications in Forest Renewal and Forest Production. Proceedings of Forest Climate 86 Symposium. 307 pp. Supply and Canada. ISBN #0-660-13096-3.
 Meades, W.J. 1989. Successional status of ericaceous dwarf shrub heath in eastern Newfoundland. Poster presented to the 32nd Symposium of The International Association of Vegetation Ecologists. Abstract In STUDIES IN PLANT ECOLOGY 18: p. 176
- 4303 Meades, W.J. and L. Moores. 1989. Forest site classification manual: A Field Guide to the Damman Forest Types of Newfoundland. FRDA REPT.# 3. Supply And Services Canada and Govt. of Nfld. and Labrador. ISBN# 0-662-14644-1
 Ecoregions Working Group 1989. Eco-Climatic Regions of Canada, First Approximation. Canada Committee on Ecological Land Classification, ELC Series No. 23, 119 pp. (Nfld. and Labrador by W.J. Meades)
 Meades W.J. - Lecture on forest ecology to MUN pre-Forestry class.
- 4304 Roberts, B.A. 1989. The growth and development of white spruce *Picea glauca* in Newfoundland. Poster presented at the IUFRO S1.05-12 Northern Forest sivicultural and Management Working Party, 1989 Symposium, Newfoundland, Canada.
 Roberts, B.A. 1989. Red pine at Grants Pit. In (p. 12-18), Field Tour Notes "The Silvics and Ecology of Boreal Spruces" 1989 IUFRO Symposium, Newfoundland, Canada.
 Poster presented at the international AIBS/CBA conference held at the University of Toronto 6-10 August 1989. Roberta, B.A. 1989. The origin and development of white spruce, *Picea glauca* forest stands in central Newfoundland. Amer. J. Bot. 76: 138.

- 4305 Roberts, B.A. and J. Hudak. 1989. Remote sensing activities in Newfoundland in 1989. Report to the Forestry Canada Working Group on Remote Sensing. Laurentian Forestry Centre, St. Foy. Quebec. Oct. 1989.
- 4306 D.B. Pike and W.J. Meades 1989. A preliminary evaluation of FORCYTE-11 using western Newfoundland Balsam Fir data. Proceedings of the 7th Canadian Bio-Energy R&D Seminar, pp. 198-203. National Research Council of Canada. ISBN #0-660-55096-2.
- 4306 Meades W.J. and M.J. Apps 1989. FORCYTE-11: Current status and future opportunities for application to forest management. Poster Presentation. Forest Research Marketplace. Toronto, Ontario, November 21-23, 1989.
- 4307 File Report: An environmental sensitivity analysis of the Corner Brook watershed area. 84 pp. + maps. December 1989.

iv) Lectures, Seminars, and Scientific Addresses:

- 4307 1. June 1989, lecture and field trip regarding land sensitivity classification presented to the watershed monitoring committee for the city of Corner Brook.
2. February 1989, lecture and workshop regarding applications of land sensitivity mapping presented to the watershed monitoring committee for the city of Corner Brook.
3. March 1990, lecture regarding the use of pedologic, hydrologic, and geomorphic factors for interpretation of land sensitivity potential presented to Memorial University forestry class.

v) Other Technology Transfer:

- 4307 1. Consultation with provincial Department of Forestry and Agriculture personnel regarding terms of reference for land sensitivity studies in Labrador.
2. Provision of guidance to and review of land sensitivity mapping undertaken by private contractors for the provincial Department of Forestry and Agriculture.

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4301	1. Complete first draft of PhD thesis; 2. Prepare 2-3 journal manuscripts from PhD results	1. Annual height and diameter re-measurements, and foliar samples completed; 2. Paper presented (Aug. 1989 at "Peat and Peatlands '89" Symposium, Quebec; 3. Poster on peatland forestry presented (Nov 1989), at "Marketplace " in Toronto.	1. Complete thesis and publish results 2. Continue with re-measurements of water table, soil temperatures, & tree growth on peatland forestry sites 3. Initiate studies on anaerobiosis, soil mineralization and respiration rates on peatland forestry sites; 4. Initiate cooperative study on BF/EHL insect herbivory;	1. Publish results of PhD thesis; 2. Continue with re-measurement of water table soil temperatures, tree growth, & studies on anaerobiosis, soil mineralization and respiration and species trials on peatland forestry sites; 2. Complete cooperative BF/EHL insect herbivory study	1. Continue with re-measurements of water table, soil temperatures and tree growth, anaerobiosis, soil mineralization and respiration and species trials on peatland forestry sites; 2. Complete cooperative BF/EHL insect herbivory study
4302	1. Monitor seedfall in BS cutover. 2. Three year plot re-measurement of cutover vegetation plot.	1. Seed Traps Monitored as Scheduled. 2. Three Year Plot Re-measurements Completed As Planned.	1. Analyse data BS cutover succession. 2. Prepare a draft report on BS cutover succession.	1. Publish results of BS succession study. 2. Review study to determine if longterm monitoring is warranted.	1. Dependent on 2. Above (????)

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4303	3. Photograph vegetation plots.	3. Plots Photographed.			
	1. Publish Site Manual	1. Site Manual Published.			
	2. Complete Vegetation Field Survey of W.Mfld. Cutovers	2. Field Survey Completed			
	3. Initiate data analysis of 2 above	3. Data entered, software installed.	1. Analyse data and prepare a draft report on cutover studies	1. Publish results of cutover vegetation classification.	1. Continue GIS mapping study.
	4. Advise contractor on C.Mfld.cutover vegetation survey.	4. Contract completed on time and within budget.	2. Hold site classification workshop.	2. Initiate pilot site GIS mapping field studies under PRDA.	
4304	1. Continue cone and seed survey				
	2. Continue wildfire and red pine study		3. Initiate application of GIS to forest site classification.		
	3. Two poster presentations plus a journal note.	1. Report published first study.	1. Analyse data, produce draft report.	1. Publish results second survey.	1. Publish second report
	4. Re-sample foliage for nutrient determinations after fire.	2. Draft report completed.	2. Draft report on white spruce.	2. Publish report on study.	2. Publish final report.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4305	1. Assess the properties of soils of Kalmia dominated sites.	1. Chemical analyses completed.	1. Draft report	1. Publish results.	1. Publish final report.
	2. Assess the uptake of metals by plants on selected soils.	2. Book chapters edited.	2. Publish results.	3. Produce final report.	2. Initiate sampling second group of plants.
	3. Assess the weathering in soil profiles from western Newfoundland.	3. Draft report completed.	3. Produce poster.	4. Complete field work, publish interim report	4. Produce report.
	4. Assess the effects of flooding in the Churchill River hydro site.	4. Field work partially completed.			
4306	1. Attend Bio-Energy R&D Seminar.	1. Symposium attended and poster and paper presented.	1. Publish information reports on calibration and evaluation.	1. Contribute to a journal paper on national evaluation of model	7777 (See 2 Above)
	2. Participate in FORCITE working group meeting.	2. Workshop held in St. John's Oct. 1989	2. Present poster at World IUFRO Congress Montreal, August 1990	2. Possible application to BS whole-tree harvesting in central Nfld.	

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
4307	contract for model calibration.	time lost on debugging model.	Kananaskis, Albt. May, 1990		
	4. Prepare results on model calibration and evaluation.	4. Reports not completed due to late delivery of benchmark model and time lost on debugging			
	1. To prepare an information report documenting an environmental sensitivity analysis for the Corner Brook Lake watershed area. 2. To design and initiate a field study to investigate skid trail disturbances associated with varying site and terrain conditions		To proceed with studies		

GOALS VS. ACHIEVEMENTS 1989/90		3 YEA STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	3. To design and initiate a study to test soil loss estimates for varying site and terrain conditions.				
	4. To conduct preliminary field observations as an aid to study design.				

8. LONG TERM PROJECTIONS

- 2214 Workshops will be provided for the recently published site classification system. Information reports will be prepared for studies 4302, 4303, 4306 and 4307 results to date. A major initiative will be launched to apply GIS technology to forest site classification and succession systems.

Results from peatland drainage trials will provide basic information needed to assess the biological feasibility of increasing the forest land base by peatland afforestation.

Studies on the growth characteristics of white spruce, larch and red pine will provide guidelines for implementation of these species in forest renewal programs.

Study leaders will also provide advisory services for public and private groups concerned with sustainable development and habitat protection.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2214 The provincial Department of Forestry and Agriculture has cooperated with FORCAN on the development of a forest site classification manual. Abitibi-Price provided support in the establishment of experimental sites for studies 4301 and 4302. The provincial forest service, through FRDA, financially supported the establishment of the peatland drainage experiment. The province, Kruger, and FORCAN have collaborated on developing guidelines for harvesting the Corner Brook watershed (Study 4307).

Study leaders routinely provide advisory services on vegetation habitats to the following agencies: Nfld. Hydro, Parks Canada, CWS, Nfld. Parks and Wildlife. Study leaders also provide courses and invited lectures to Memorial University. In addition, FORCAN is represented on the following committees:

1. FORCAN SCALE Working Group.
2. FORCAN Remote Sensing Working Group.
3. Peatland Working Group - CCELC
4. Nfld. and Labrador Wilderness and Ecological Reserves Advisory Council (WERAC).
5. Environmental Assessment and Review Committee (Tally Pond).

10. EVALUATIONS

- 2214 A FORCAN peer review was conducted in February, 1988.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/43 [RR/PP]
 TITLE: FOREST AND WETLAND ECOLOGY
 RESP. CENTRE: 4162 LEADER: MEADES, W.J.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2214
 EVALUATION-PREV: 00/01 NEXT: /

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

----- FINANCIAL RESOURCES (\$000) -----

SAL	\$155.2	\$144.6	\$217.3	\$210.5	\$0.0	\$0.0	\$0.0
O&M	\$12.2	\$9.0	\$9.0	\$19.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$12.2	\$9.0	\$9.0	\$19.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$167.4	\$153.6	\$226.3	\$229.5	\$0.0	\$0.0	\$0.0

----- PERSON YEARS - PROFESSIONAL & OTHER -----

PY-P	1.8	1.8	3.8	3.8	0.0	0.0	0.0
PY-O	1.9	1.9	1.6	1.6	0.0	0.0	0.0
TOTL	3.7	3.7	5.4	5.4	0.0	0.0	0.0

----- COOPERATORS RESOURCES (\$000) -----

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

----- DESCRIPTION -----
 RESEARCH ON NATURAL ECOLOGICAL PROCESSES IN FOREST ECOSYSTEMS, WETLANDS AND
 HEATHLANDS; AND INVESTIGATION OF SITE PRODUCTIVITY AND SUCCESSIONAL
 RELATIONSHIPS AND THE IMPLICATIONS FOR FOREST MANAGEMENT.

----- TECHNOLOGY CENTRES POLICY (\$000) -----

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91- 1992/93

1. PROJECT : 2222 REFORESTATION

2. FORESTRY CANADA PROGRAM : 2200/2220

3. PROJECT PROFILE : 1990/91

Project Leader : B.D. TITUS

Total A-Base P/Y's : 5.0

Total A-Base O&M : 25.5K

Total Other P/Y's : 0.0

Total Other O&M : 1.5K (ENFOR)

Strategic Forest Sector Issues: 1, 4, 5

Studies:

2202 COMPETITION CONTROL ON FOREST SITES

Study Leader : B.D. TITUS

A-Base P/Y's : 0.2

A-Base O & M : 1.0K

Initiated : 1974

Other P/Y's : 0.0

Other O & M : 0.0

2204 REGENERATION ASSESSMENT

Study Leader : P.F. NEWTON

A-Base P/Y's : 1.0

A-Base O & M : 3.5K

Initiated : 1984

Other P/Y's : 0.0

Other O & M : 1.5K (ENFOR)

2206 PLANTATION RESEARCH

Study Leader : B.D. TITUS

A-Base P/Y's : 0.2

A-Base O & M : 1.0K

Initiated : 1973

Other P/Y's : 0.0

Other O & M : 0.0

2207 SITE PREPARATION RESEARCH

Study Leader : B.D. TITUS

A-Base P/Y's : 0.6

A-Base O & M : 4.0K

Initiated : 1985

Other P/Y's : 0.0

Other O & M : 0.0

2208 POPULATION GENETICS OF FOREST SPECIES

Study Leader : A.J. MOSSELER

A-Base P/Y's : 2.0

A-Base O & M : 11.0K

Initiated : 1988

Other P/Y's : 0.0

Other O & M :

2210 BOTWOOD KALMIA TRIAL

Study Leader : B.D. TITUS

A-Base P/Y's : 1.0

A-Base O & M : 5.0K

Initiated : 1987

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

- 2222 It is predicted that Newfoundland and Labrador will incur significant timber supply shortages in both the short- and long-term. Under FRDA, the intensity of management has been increasing to help reduce this anticipated shortfall. In order to maximize efficiency, it is essential that sites be identified either before or after harvesting that will require artificial regeneration. Environmentally sound site-specific prescriptions must then be developed to maximize survival and growth through use of appropriate site preparation methods, choice of species and planting stock type, use of genetically improved stock, and competition control, where appropriate.

5. OBJECTIVES

a) Project Objectives

- 2222 To assist forest managers to maximize the success of their reforestation programs: by developing methodologies for the efficient and accurate identification of sites requiring artificial regeneration; by quantifying the effects of mechanical site preparation on microsite properties, and resultant seedling response; by quantifying the growth of different planting stock types on different sites; by enhancing productivity through exploiting genetic variation; by quantifying the response of conifers to release from competing vegetation.

b) Study Objectives

- 2202 To quantify the response of softwood species to release from competing vegetation.
- 2204 To develop objective assessment methods and treatment criteria for black spruce and balsam fir seedling populations developing on recently harvested sites in central and western insular Newfoundland.
- 2206 to quantify the growth of different planting stock, and different quality of different stock, over a range of sites.
- 2207 To quantify the effects of mechanical site preparation on microsite properties, and resultant seedling response.
- 2208 To assist forest managers in increasing forest productivity by identifying genetic and environmental sources of variation that effect the growth performance of tree species.

To determine the need for establishing breeding zones on the island of Newfoundland.

To obtain information on seed production and maturation processes to assist forest managers in seed procurement.

To preserve native gene pools of rare or endangered tree species.

- 2210 To quantify the response of conifers and Kalmia to different reforestation prescriptions for disturbed sites dominated by Kalmia.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2222 Reforestation research has always been an important component of the overall Forestry Canada scientific program in the Newfoundland and Labrador Region. Before the present round of Federal-Provincial Agreements led to the development of a major silvicultural program in the province, a wide range of trials were carried out by Forestry Canada, including afforestation trials on the Avalon Peninsula barrens, extensive post-fire reforestation trials at North Pond, various peatland afforestation trials, and seeding trials. In the last decade, the emphasis in research has centered on problems and questions associated with the provincial silvicultural program: development of an objective regeneration assessment technique, comparison of performance of different planting stock, examination of the effects of mechanical scarification on seedling survival and growth, reforestation of sites dominated by Kalmia, use of herbicides, and various aspects of population genetics and tree improvement.

b) Project Highlights, 1989/90

- 2222 A Ph.D. study program at U.B.C. was initiated (Study 2204); with the assistance of the DFA, 8-year re-measurements were carried out on 9 plantations, and the data analysed (Study 2206); with the assistance of the DFA, a major 3-year assessment of site preparation trials was completed, and the data analysed (Study 2207); a gel electrophoresis lab was established, an electrophoretic study on red pine populations was completed, and four journal papers were accepted for publication (Study 2208).

In addition: B.D. Titus chaired, and P.F. Newton sat on the Organizing Committee for the IUFRO Working Party S1.05-12 Annual Symposium, held in Newfoundland in August 1989; B.D. Titus continued to serve on the Editorial Board of the reforestation journal "New Forests"; B.D. Titus was elected chairman of the CIF/IFC Forest Science and Technology Board; A.J. Mosseler was made an Adjunct Professor of M.U.N.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

- 2208 (1) Mosseler, A. 1990. Hybrid performance and crossability relationships in willows (Salix L.). Can. J. Bot. 68: (In Press).

- (2) Kim, K.H., Zsuffa, L., Kenney, A. and Mosseler A. 1990. Interspecific and intraspecific variation in pollen morphology in four species of Salix L. Can. J. Bot. 68: (In Press).
- (3) Mosseler, A. and Papadopol, C.S. 1989. Seasonal isolation as a reproductive barrier among sympatric Salix species. Can. J. Bot. 67: 2563-2570.
- (4) Mosseler, A. 1989. Interspecific pollen-pistil incongruity in Salix L. Can. J. For. Res. 19: 1161-1168.

iii) Other Reports:

- 2202 Richardson, J. and Titus, B.D. 1989. Control of hardwood competition and release of softwood regeneration on a mixed wood cutover in western Newfoundland. In: E.T. Oswald, ed. 1989. Vegetation Management Activities of Forestry Canada: A Compendium of Summaries 1988/89, Forestry Canada HQ, p. 3
- Richardson, J. and Titus, B.D. 1989. Release of young spruce and pine from alder competition. In: E.T. Oswald, ed. 1989. Vegetation Management Activities of Forestry Canada: A Compendium of Summaries 1988/89, Forestry Canada HQ, p. 4.
- 2210 Titus, B.D., Meades, W.J., and Roberts, B.A. 1989. Establishment of softwoods on sites dominated by sheep-laural. In: E.T. Oswald, ed. 1989. Vegetation Management Activities of Forestry Canada: A Compendium of Summaries 1988/89, Forestry Canada HQ, p. 5

iv) Lectures, Seminars, and Scientific Addresses:

- 2208 Mosseler, A. Genetic variation in disjunct Newfoundland populations of red pine. Seminar presented during the Newfoundland Forestry Centre's Departmental Seminar Series.

v) Other Technology Transfer:

- 2204 Poster presentation entitled 'Point-density estimation within black spruce/balsam fir seedling populations' given at the Forestry Research Marketplace, Toronto, Ontario. November 23, 1989.

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2202	1. To complete analysis of past re-measurements, publish results, and transfer results to clients conditional on statistical support 2. To provide advice to clients as required	1. Analysis not complete due to lack of funding for statistical advice sufficient to complete analysis 2. Prepared study plan and applied for permits for "timing of application of Vision to Kalmia" study	1. Assist A-P in establishing "timing of application of Vision to Kalmia" study 2. Assist A-P with data analysis of "timing ..." study	1. Assist A-P with data collection of "timing ..." study 2. Write up results of "timing ..." study	none
2204	-Continue to transfer results regarding this new method as part of operational assessment -Initiate data analysis to identify factors affecting hierarchy development -Initiate data analysis using plant growth analysis and allometric models -Initiate data collection to develop methods for assessing performance of b5 conversions in Western Newfoundland -Begin PhD at UBC	Poster presented at Forestry Research Marketplace, Toronto Analysis started Analysis started Data acquisition initiated Program begins 2/1/90	Evaluate fixed-precision sequential sampling methodology under the auspices of a PhD program at UBC Continue plant growth analysis Publish size hierarchy results Continue b5 conversion related data acquisition and analysis	Concentrate on PhD program Complete data acquisition for b5 conversion and analysis	Concentrate on PhD program Initiate analysis of b5 conversion data

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2206	1. To complete analysis of 5-year height and survival data 2. To publish five year results 3. To complete 8-year re-measurements	1. Analysis not completed 2. Publication not completed 3. Most 8-year re-measurements completed (two plantations not completed by co-operators), and all data successfully analysed	1. To complete eight-year remeasurements 2. To complete data analysis, and publish results 3. To transfer results to client agencies through seminars and field seminars 4. To initiate ten-year remeasurements by cooperators	1. To carry out initial analysis of ten-year re-measurements 2. To complete ten year remeasurements 3. To complete transfer of responsibility for trials to province 4. To complete 10-year data analysis, and publish results	

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2207	1. To carry out final planting for Delayed planting trial	1. Planting completed	1. To continue to monitor soil microenvironment	1. To publish results of soil microenvironment monitoring	1. To initiate new site preparation trial
	2. To continue to monitor soil microenvironment	2. Soil temperature and soil leachates collected regularly	2. To publish results of 3-year assessment	2. To carry out 5-year height and survival assessment	
	3. To carry out 3-year height and survival assessment	3. Assessment completed, and data analysed			
2208	1. Process seed from black and white spruce cones collected in 1988.	1. To be completed.	1. Finish processing seeds from 1988 black and white spruce cone collections.	1. Establish several red pine gene pool collections for operational seed procurement and for preservation of the biomass	1. Submit several journal papers on cone and seed production in native spruces.
	2. Establish Newfoundland range-wide collection of Salix discolor.	2. Salix discolor tests established at Mount Pearl and Pasadena.	2. Establish a fully operational gel electrophoresis facility.	2. Carry out statistical analyses of cone and seed production data for several studies on native spruces	2. Analyse biomass production in Salix studies and select clones for use in conifer nurse crop tests.
	3. Collect and process cones collected from native red pine gene pool.	3. Red pine seed extraction completed.	3. Establish several biomass production tests to develop a suitable nurse crop for conifers on windswept barrenlands.		
	4. Establish gel electrophoresis facility at NLR.	4. Electrophoretic facility almost operational, some equipment still needed.			

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	5. Begin electrophoretic analysis of Newfoundland's red pine gene pool	5. Electrophoretic study of red pine has been completed.			
	6. Submit three journal publications on past research with Salix.	6. Four journal articles accepted for publication.			
2210	1. To continue as co-ordinating agency	1. Continued co-ordinating activity	1. To continue as co-ordinating agency	1. To continue as co-ordinating agency	1. To continue as co-ordinating agency
	2. To process IER and decomposition samples and analyse data	2. Decomposition samples completed; IER not completed, due to lack of analytical support from Analytical Services	2. To oversee planting and application of fertilizer	2. To write Establishment Report	2. To oversee 2nd year assessment
	3. To analyse data from 21,600 vegetation plots	3. Vegetatin plots not analysed	3. To oversee assessment of seedlings after 1st summer	3. To oversee first year assessment	
	4. To apply herbicides to trial	4. Herbicides successfully applied			

8. LONG TERM PROJECTIONS

- 2222 These will be a function of client support and outside funding, given dwindling (in real terms) projected ForCan resources. In particular, field trials can only be carried out with additional funding. Conditional on support: the development of regeneration assessment methodologies and subsequent integration into silvicultural decision-support models; autoallelopathy in black spruce ecosystems will be investigated further; present herbicide trials will be re-measured (15-year results), depending on the results of the present data base; herbicide efficacy and timing of application trials will be developed for client agencies to execute on sites dominated by *Kalmia*, if the results of Study 2210 indicates that this is recommended for *Kalmia* control; plantation research (Study 2206) will be terminated, and handed over to the province for maintenance and continued monitoring; mechanical site preparation trials will be expanded to include a range of ecosystems; prescribed burning trials in black spruce ecosystems will be established; seed sources that will maximize forest productivity in Newfoundland will be identified and a system of breeding zones will be established to control seed collection and allocation in Newfoundland and Labrador if present provenance and population studies indicate that it is warranted; provenance tests will be used to monitor the effects of anticipated climatic change on forest growth and reproduction; genetic aspects of biomass production will address the rapid changes currently underway in biotechnology and "genetic engineering".

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2222 Department of Forestry and Agriculture
Corner Brook Pulp and Paper Ltd.
Abitibi-Price Inc.
M.U.N.

10. EVALUATIONS

- 2222 The most recent Project Review was held in February 1989. The next Project Review is due in February 1992.

National Program Assessments for Genetics took place in 1988, and Reforestation in 1989.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/22 [RR/PP]
 TITLE: REFORESTATION
 RESP. CENTRE: 4162 LEADER: TITUS, B.D.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2222
 EVALUATION-PREV: 00/01 NEXT: 00/88

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

----- FINANCIAL RESOURCES (\$000) -----

SAL	\$229.7	\$192.6	\$250.5	\$261.4	\$0.0	\$0.0	\$0.0
O&M	\$20.9	\$18.0	\$18.0	\$29.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$20.9	\$18.0	\$18.0	\$29.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$250.6	\$210.6	\$268.5	\$290.4	\$0.0	\$0.0	\$0.0

----- PERSON YEARS - PROFESSIONAL & OTHER -----

PY-P	2.3	2.3	3.0	3.0	0.0	0.0	0.0
PY-O	2.3	2.3	3.0	3.0	0.0	0.0	0.0
TOTL	4.6	4.6	6.0	6.0	0.0	0.0	0.0

----- COOPERATORS RESOURCES (\$000) -----

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

----- DESCRIPTION -----
 RESEARCH ON SILVICULTURAL TECHNIQUES REQUIRED TO OVERCOME SITE
 PROBLEMS AFFECTING FOREST PRODUCTIVITY AND TO MAXIMIZE FOREST PRODUCTIVITY
 THROUGH INTENSIVE MANAGEMENT.

----- TECHNOLOGY CENTRES POLICY (\$000) -----

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2223 TREE AND STAND GROWTH

2. FORESTRY CANADA PROGRAM : 2200/2220

3. PROJECT PROFILE : 1990/91

Project Leader : M.B. LAVIGNE

Total A-Base P/Y's : 3.0

Total A-Base O&M : 12.0K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

Strategic Forest Sector Issues: 4, 5

Studies:

2401 INFLUENCE OF STAND DENSITY AND FERTILIZATION

Study Leader : M.B. LAVIGNE

A-Base P/Y's : 0.5

A-Base O & M : 3.0K

Initiated : 1967

Other P/Y's : 0.0

Other O & M : 0.0

2404 PHYSIOLOGICAL PROCESS MODELS OF TREE AND STAND GROWTH

Study Leader : M.B. LAVIGNE

A-Base P/Y's : 1.5

A-Base O & M : 6.0K

Initiated : 1979

Other P/Y's : 0.0

Other O & M : 0.0

2405 DEVELOPMENT OF STAND DENSITY MANAGEMENT MODELS

Study Leader : P.F. NEWTON

A-Base P/Y's : 1.0

A-Base O & M : 3.0K

Initiated : 1984

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

2223 Forest managers can increase the merchantable yields by controlling species composition and spacing between trees, and by supplementing the supplies of nutrients. These factors determining productivity are manipulated when planting, thinning, fertilizing and controlling competing vegetation. Estimates of the gains in yield that can result from each of these practices are required to efficiently allocate silvicultural investments so as to minimize the expected wood supply shortage. However, little growth and yield data are available for silvicultural practices in Newfoundland because silviculture has been practiced only for a short

time. Therefore, it is necessary to develop growth models based on ecological principles and physiological processes to provide yield predictions. Growth models that are biologically based are also needed for estimating effects of changes to the environment, for example by climate change, on future tree growth.

5. OBJECTIVES

a) Project Objectives

- 2223 (1) To examine and assess the ecological and physiological processes involved in tree growth and stand development as a basis for incorporating site and stand factors, and silvicultural practices into growth and yield models.
- (2) To cooperate with other forest agencies in this province in setting out silviculture field trials for the purpose of producing good quality growth and yield data in the future.

b) Study Objectives

- 2401 To obtain estimates of the productivity gains attainable from precommercial thinning and fertilizing natural softwood stands, and through optimum spacing of planted stands, and to define standards for the application of treatments that will maximize benefits.
- 2404 To obtain basic information about the ecophysiology of the important tree species in Newfoundland. To develop models of forest growth based on physiological processes for assessing responses to silvicultural practices and responses to the changing environment.
- 2405 To develop stand density management models for forest types consisting of commercially important species. This will be realized through the attainment of the following secondary objectives: (i) Quantification of the effects of intra- and inter-specific competition on the growth and development of forest stands using both traditional mensuration techniques and plant growth analysis; (ii) Evaluation of the conceptually based yield-density relationships on both an empirical and theoretical basis; and (iii) Quantification of the allometric relationships between various tree components.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2223 The need for growth and yield predictions in silviculturally treated stands arose only in the late 1970's, when silviculture was first practiced. Yield predictions are urgently required for management planning and refining the application of treatments. This project has grown since 1979 when the first spacing trial in a precommercially thinned stand was installed. The approach taken has been influenced by the urgent need for yield predictions and the lack of empirical data of

growth in treated stands. Spacing and fertilization trials have been established in precommercially thinned stands; spacing trials have been established in plantations; research on relationships between stem respiration and stem growth has been completely - this research was essential for developing a physiological process model of forest growth; an investigation of the $-3/2$ self-thinning rule has assessed its suitability for inclusion in a growth model; the effects of defoliation on responses of black spruce to precommercial thinning was completed.

b) Project Highlights, 1989/90

- 2223 A spacing trial was remeasured. Several papers were published. A trenching/fertilization experiment was continued.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

- 2401 Lavigne, M.B., and J.G. Donnelly 1989. Early results of a spacing trial in a precommercially thinned balsam fir stand in western Newfoundland. Info. Rep. N-X-269. 23 p.

iii) Other Reports:

- 2404 Lavigne, M.B. 1989. Distribution of annual growth among above-ground components in young, thinned balsam fir stands. Poster presented at Modelling to Understand Forest Functions. IUFRO Whole Plant Physiology Working Party Symposium (S2.01-15). Joensuu and Hyttiala, Finland. July 25 - July 1, 1989.

iv) Lectures, Seminars and Scientific Addresses:

Nil

v) Other Technology Transfer:

- 2405 Poster presentations entitled 'Applicability of the self-thinning rule to black spruce' and 'Initial response of black spruce to operational precommercial thinning' were given at the 1989 IUFRO (Working Party S1.05-12) symposium in central Newfoundland.

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2401	remeasure 1 spacing trial; complete growth analysis of trees harvested at a spacing trial	the Jeffries spacing trial was remeasured; growth analysis of 35 trees harvested at Cormack was completed; an Information Report was published.	publish the results of growth analysis; to cooperate with the province to establish additional spacing trials to measure photosynthesis, respiration and growth and determine carbon budgets of trees representing each treatment in the thinned stand	remeasure spacing trials	remeasure spacing trials
2404	to maintain the trenching/fertilization experiment	trenches were redug, fertilizer was applied		publish results; continue work of comparing crown development and productivity of balsam fir, black spruce and white birch	publish results; continue fieldwork

GOALS VS. ACHIEVEMENTS 1989/90			3 YEA STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2405	Transfer results of evaluation of self-thinning relationships to clients Continue data acquisition activities Complete assessment of inter-specific volume growth relationships within mixed stands Prepare base-age invariant polymorphic site index curves for central Newfoundland To prepare stem analysis software for client agencies	Poster presented at IUFRO Symposium (Working Party 51.05-12) Ongoing Completed and submitted for publication Completed and submitted for publication Completed and submitted for publication	Continue data acquisition and analysis under the auspices of a Ph.D. program at U.B.C. <		

8. LONG TERM PROJECTIONS

- 2223 To develop models for providing projections of forest productivity in response to silvicultural activities and changes to the environment.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2223 Spacing trials are established in cooperation with Dept. of Forestry and Agriculture, Corner Brook Pulp and Paper Ltd. and Abitibi-Price Inc. Yield predictions for use in wood supply analyses are made in cooperation with the Dept. of Forestry and Agriculture. Outputs of this project are intended for forest managers in Newfoundland and fellow scientists.

10. EVALUATIONS

- 2223 The project was evaluated in 1985.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADA

INTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/24 [RR/PP]
TITLE: TREE AND STAND GROWTH
RESP. CENTRE: 4162 LEADER: LAVIGNE, M.B.
PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2223
EVALUATION-PREV: 00/86 NEXT: 00/89

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$155.6	\$174.3	\$117.1	\$114.3	\$0.0	\$0.0	\$0.0
O&M	\$12.2	\$9.5	\$9.5	\$12.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$12.2	\$9.5	\$9.5	\$12.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$167.8	\$183.8	\$126.6	\$126.3	\$0.0	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	2.5	2.5	1.5	1.5	0.0	0.0	0.0
PY-O	1.7	1.7	1.5	1.5	0.0	0.0	0.0
TOTL	4.2	4.2	3.0	3.0	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
PROJECT TO ASSESS THE GROWTH AND YIELD POTENTIAL OF NEWFOUNDLAND'S PRINCIPAL TREE SPECIES IN RESPONSE TO VARIOUS PERTURBATIONS; TO EXAMINE FACTORS INFLUENCING TREE AND STAND GROWTH; TO DEVELOP AND SPECIFY DENSITY/YIELD MANAGEMENT MODELS.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2232 PEST BIOLOGY RESEARCH
2. FORESTRY CANADA PROGRAM : 2200/2230
3. PROJECT PROFILE : 1990/91

Project Leader : A.G. RASKE
Total A-Base P/Y's : 11.2
Total A-Base O&M : 47.0

Total Other P/Y's : 0.3
Total Other O&M : 82.0

Strategic Forest Sector Issues: 1, 2, 3, 5

Studies:

2701 FACTORS DAMAGING TO CONE CROPS

Study Leader : R.J. WEST
A-Base P/Y's : 1.0
A-Base O & M : 7.0K
Initiated : 1976

Other P/Y's : 0.0
Other O & M :

2702 PLANTATION AND REGENERATION PESTS

Study Leader : R.J. WEST, G.R. WARREN
A-Base P/Y's : 1.1
A-Base O & M : 9.0K
Initiated : 1984

Other P/Y's : 0.0
Other O & M :

2703 BALSAM WOOLLY ADELGID

Study Leader : W.W. BOWERS
A-Base P/Y's : 2.0
A-Base O & M : 4.5K
Initiated : 1984

Other P/Y's : 0.0
Other O & M : 0.0

2704 ARMILLARIA ROOT ROT

Study Leader : G.R. WARREN (A.G. RASKE)
A-Base P/Y's : 0.4
A-Base O & M : 2.0K
Initiated : 1973

Other P/Y's : 0.0
Other O & M :

2705 DETERIORATION OF INSECT DAMAGED TREES

Study Leader : G.R. WARREN

A-Base P/Y's : 1.0

Other P/Y's : 0.3

A-Base O & M : 3.5K

Other O & M :

Initiated : 1966

2706 DECAY AND WOOD QUALITY OF LIVING TREES

Study Leader : G.R. WARREN

A-Base P/Y's : 0.5

Other P/Y's : 0.0

A-Base O & M : 3.0K

Other O & M :

Initiated : 1966

2707 ROLE OF WOODBORERS AND BARK BEETLES IN TREES

Study Leader : W.W. BOWERS

A-Base P/Y's : 0.2

Other P/Y's : 0.0

A-Base O & M : 2.0K

Other O & M : 0.0

Initiated : 1978

2708 POPULATION STUDIES OF MAJOR DEFOLIATORS

Study Leader : VACANT (E.J. DOBESBERGER)

A-Base P/Y's : 0.8

Other P/Y's : 0.0

A-Base O & M : 2.0K

Other O & M : 0.0

Initiated : 1968

2709 BIOLOGICAL MORTALITY FACTORS OF MAJOR DEFOLIATORS

Study Leader : K.P. LIM

A-Base P/Y's : 0.6

Other P/Y's : 0.0

A-Base O & M : 2.5K

Other O & M : 0.0

Initiated : 1968

2710 IMPACT OF MAJOR DEFOLIATORS

Study Leader : A.G. RASKE

A-Base P/Y's : 1.8

Other P/Y's : 0.0

A-Base O & M : 4.5K

Other O & M : 0.0

Initiated : 1977

2711 IMPACT OF SPRUCE BUDWORM ON FOREST SUCCESSION

Study Leader : W.J. MEADES

A-Base P/Y's : 0.1

Other P/Y's : 0.0

A-Base O & M : 1.0K

Other O & M : 0.0

Initiated : 1981

2712 EFFECTIVENESS OF INSECTICIDES

Study Leader : R.J. WEST, A.G. RASKE

A-Base P/Y's : 0.3

Other P/Y's : 0.0

A-Base O & M : 1.0

Other O & M :

Initiated : 1985

2713 SEX PHEROMONE OF HEMLOCK LOOPER

Study Leader : W.W. BOWERS, R.J. WEST

A-Base P/Y's : 1.5

Other P/Y's : 0.0

A-Base O & M : 5.0

Other O & M : 82.0

Initiated : 1987

4. PROBLEM DEFINITION

- 2232 Forest insect and diseases are the major cause of natural depletion of Newfoundland forests. In addition to causing forest losses such as reduced growth and tree mortality, forest pests frequently influence the reproductive capacity of the forests, their natural succession and aesthetic values. Intensive forestry practices are increasing with many resources being expended to enhance growth of trees in reforestation efforts, or enhance growth of young natural stands. Therefore an increased focus on regeneration and plantation pests has followed to protect the future wood supply. The projected increased demand for wood and for other uses of the forests makes it essential that forest losses from pests be minimized through better understanding of pest problems and through the development of more effective control methods.

5. OBJECTIVES

a) Project Objectives

- 2232 Major research thrusts of this project are to develop effective and practical methods for measuring population levels of forest pests and their natural control factors; to investigate the biology of pest insects, diseases and animals including their population dynamics; to assess insect and disease impact on major age classes of forest trees and stands; and to develop methods to prevent or minimize forest losses.

b) Study Objectives

- 2701 To determine the impact of seed and cone insects and squirrels on cone crops; develop procedures for monitoring and forecasting population levels and damage potential of pest species; develop and recommend cost-effective control measures.
- 2702 To identify, monitor and determine the biology of insect and disease pests of coniferous plantations and regeneration areas; evaluate the damage caused by the pest species; develop environmentally acceptable control strategies and pest management guidelines.

- 2703 To evaluate the suitability of sampling units to monitor population levels of balsam woolly adelgid; assess population levels and damage impact on growth and yield in young thinned and unthinned balsam fir stands; determine the seasonal history of balsam woolly adelgid in balsam fir stands following thinning and other silvicultural treatments; investigate the chemical basis of balsam fir resistance to balsam woolly adelgid; determine the genetic structure of balsam woolly adelgid populations in Newfoundland; investigate direct control strategies for balsam woolly adelgid attack; provide expertise, as required, to provincial governments and other agencies.
- 2704 To investigate the epidemiology of Armillaria root rot and related aspects of its biology; to determine its impact in young plantations, insect damaged stands and healthy forests; to devise a hazard rating system for susceptible areas and investigate the feasibility of control measures.
- 2705 To determine the rate of tree mortality in severely insect-damaged stands; determine the types and rates of sapwood deterioration of insect killed trees; determine the major factors influencing sapwood deterioration; investigate the effect of dead wood and progression of saprot on harvesting and debarking fiber losses; investigate the effect of saprot on pulp processing and quality.
- 2706 To determine the volume of wood lost to decay or other stem defects in commercial stands; identify the causal decay fungi and maintain a collection of these and associated fungi; determine the variability in fiber quality by studying wood density of the commercial species throughout the province; relate decay incidence and fiber quality to forest site and stand conditions; stratify the province into natural forest regions based upon site and stand conditions, to which cull and wood density factors can be applied
- 2707 To evaluate the biology, bionomics and infestation trends of secondary bark beetles; investigate cost-effective monitoring and control measures for bark beetle populations.
- 2708 To assess populations; to develop feasible sampling systems; to model population dynamics of the pest.
- 2709 To determine the abundance of parasites, predators and frequency of pathogens of the spruce budworm, hemlock looper, and other major defoliators; monitor these natural enemies and relate their incidence to host population density fluctuations; investigate the basic biological parameters of selected natural enemies.
- 2710 To estimate and model volume growth losses caused by tree or stand mortality and reduction of stemwood increment in defoliated semi-mature and immature stands; to determine stemwood growth loss, mortality and herbivory impact on young trees.
- 2711 To validate the successional model of budworm impact on future stand development; and to develop a regeneration survey method to assess successional changes.

- 2712 To develop protocols to effectively control forest insect pests by aerial application of environmentally acceptable chemical and biological insecticides.
- 2713 To isolate, identify and synthesize hemlock looper pheromone(s); study aspects of the biology of the hemlock looper related to pheromone release; develop a program incorporating pheromones and other available technologies to monitor hemlock looper moths.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2232 Research on insect pests and forest diseases have been an integral part of the total forest research effort since the initiation of forest research in Newfoundland. The emphasis in the early 1950's was research on the hemlock looper and the balsam fir sawfly, leading to the first major reports on the life history and damage for both insects. The rise of populations of the balsam woolly aphid in the 1950's and 1960's required a shift in emphasis and much knowledge was gained on the biology of this aphid and ways to sample for its abundance. A return of a hemlock looper outbreak in the late 1960's led to research increasing our knowledge about the pest, especially in the field of natural control, applied control, and deterioration of damaged wood. The accidental introduction of the birch casebearer to Newfoundland and its widespread rise to outbreak levels in the early 1970's required research on its biology, natural control factors, a sampling system and the initiation of biological control.

The unprecedented size and severity of the spruce budworm outbreak in the mid and late 1970's resulted in a major research thrust on many aspects of the spruce budworm problem. Knowledge gains were recorded in pest biology; native control factors and other factors as affecting population levels; methods of sampling and forecasting; impact on trees, stands, and forests, including forest succession; deterioration of dead trees; and economic impact to Newfoundland.

b) Project highlights, 1989/90

Pest Biology Research

- 2701 Live-trapping and removing squirrels to another location failed to prevent cone depredations in a natural black spruce stand.

Acephate implanted in October was just as effective as implants made in June in reducing insect damage to black spruce cones.

A cone pest workshop was hosted in St. John's and the proceedings published.

- 2702 A second year of data was collected on the flight period of the black army cutworm. This flight period extended from late July to early September, however most moths were trapped 10 - 31 August. Seedlings severely

defoliated in 1988 by the BAC were remeasured and showed excellent recovery in 1989. Laboratory trials demonstrated that a local cold-tolerant species of nematode was very effective in killing larvae of this cutworm.

Two varieties of Scleroderris canker (*Gremmeniella abietina*) have been identified in Newfoundland, *G. abietina* var. *typica* on hard pines on the Avalon Peninsula and *G. abietina* var. *balsamea* on sitka spruce in a plantation near Roddickton on the Northern Peninsula. New infections of this disease were restricted to hard pines around St. John's.

Three years after several black spruce plantations were severely damaged by wind desiccation in 1986, considerable tree mortality from Armillaria root rot has occurred. Even though initial recovery appeared good, tree mortality has increased from 5% in 1986 to 21% in 1989. Apparently wind desiccation stress has exposed many trees to root rot infection.

Tree mortality by Armillaria root rot has also occurred in many of the plantations established by the province and industry. Concern over the impact of this disease has led to research into its biology and pathogenicity described in Study 2704.

- 2703 Three years of data of overwintering balsam woolly adelgid nymphs in thinned and unthinned young fir stands has been compiled and is ready for analysis. Preliminary analyses suggest increasing populations of adelgids in both thinned and unthinned stands. Data has been collected comparing the life histories of the adelgid in thinned stands than in unthinned stands, and this data is being analyzed.

- 2704 In 1988 and 1989 the *Armillaria* species in Newfoundland were surveyed, because recent taxonomic revision of the genus has recognized several species formerly known as *A. mellea*.

Two species have been identified in crossings with tester strains: species IX at 13 collection sites, and species VII from 3 sites. Studies on the pathogenicity and host specificity have been initiated.

- 2705 Secondary insects play an important role in the sapwood deterioration of insect damaged timber. Fewer balsam fir killed by the hemlock looper had high bark beetle activity (6%) compared to spruce budworm damaged fir (35%). However woodwasp activity remained about the same at 25% and 29% respectively. Advanced saprot develops faster in bark beetle attacked trees since this insect facilitates the establishment of *Hirschioporus abietinus*. Siricid wood wasps inoculate *Amylostereum chailletii* during oviposition, a staining fungus, which competitively inhibits the colonization of the more rapid decayers. Reduced development of advanced saprot caused by the combination of low bark beetle activity and high woodwasp activity has allowed the salvage period to be extended to 6 years for hemlock looper killed timber compared to 4 years for spruce budworm killed timber..

- 2706 Wood density tables have been completed for the commercial tree species of Newfoundland by forest management units. Data analysis is continuing on development of site and stand stratification for natural cull and wood density factors for commercial tree species.

- 2707 Field and laboratory work on the biology and chemical ecology of the four-eyed spruce bark beetle, Polygraphus rufipennis, has been completed and data analyses and manuscript preparation are in progress.

The eastern larch beetle, Dendroctonus simplex, has at least 57 species arthropods associated with its larval galleries in Newfoundland. Two predators species are common, and an additional 22 species were either confirmed as predators or are very likely to prey on this bark beetle. Eighteen species of parasites were recorded, but only two species were common. Only one species, a wood borer, was recorded to compete for the same food and is an accidental predator of larvae. Ten species occur in the galleries, and apparently feed on the fungi that grow there. Two species of mites are associated with this beetles which are phoretic; they crawl unto the adult beetle for tree to tree transport. Other species of mites in the galleries were not identified to species, but are known to be fungal feeders.

An annotated bibliography of the eastern larch beetle was published.

- 2708 Most hemlock looper eggs within a tree on the lower mid-crown branches, followed by number of eggs in the upper crown. Few eggs were laid on the bole surface on near the tip of branches.

Spruce budworm population populations were sampled at various times during the season for the 14th consecutive generation and hemlock looper populations for the fifth generation. Within generation survival was again low; typical of collapsing and endemic populations.

- 2709 The major larval parasite of the spruce budworm of endemic populations in 1989 in Newfoundland was Glypta fumiferana, and total parasitism of larval samples was about 30%. No pupae occurred in the branch samples. About 4% of the samples were infected by fungi, mainly Entomophaga aulicae. The yeast-like organism (YLO) was detected in about 19% of the cadavers of laboratory-reared larval samples. Less than 1% of the samples were infected by the microsporidian Nosema fumiferana.

About 3% of the hemlock looper larval samples collected in 1989 on the Northern Peninsula were parasitized by Ichneumonid parasites, and tachinid parasites caused about 1% mortality of the pupal samples. About 2% of the larval samples were infected by fungi; mainly fungi imperfecti. The YLO was detected in about 11% of the larval samples. Less than 1% of these samples was infected by a microsporidian, tentatively identifies as Pleistiphara schubergi; a new host record.

Two species of black yeast fungi are consistently recovered from field-collected spruce budworm and hemlock looper cadavers: Aureobasidium pullulans and Hormonema dematioides. In local samples these may abundant in a high percent of the larvae.

- 2710 A stochastic simulation model has been developed to evaluate the impact on stemwood growth of various aggregations of late-instar larvae of the spruce budworm. This model is based on two years of feeding on young balsam fir stands. Because budworm larvae tend to aggregate within such young stands, the net volume impact is generally reduced. This was particularly evident at low to moderate population levels.

- 2712 No experimental spray program was carried out in 1989 in Newfoundland. Reports and a poster on the spray programs from 1985 to 1988 were produced.
- 2713 Field studies evaluated the effects of age, temperature, mated status and fed or unfed status on the calling pattern of hemlock looper moths. Fluorescent light traps were attractive to male moths. Preliminary extracts of female moth volatiles were obtained for further analyses to identify pheromone components. Peak moth flight of both sexes occurs about 30 minutes after sunset, and males continue to fly all night, but at reduced frequencies. Both sexes may emigrate from a stand, and females may carry up to an average of 20% of her eggs with her. Mated females always have a swollen spermatheca that usually contains a spermatophore (though up to three complete or partial ones may occur). Recently mated males have their long ejaculatory duct empty, however it has not been determined how quickly it refills. The internal reproductive structures are of the ditrysian type, and consist of long many-coiled structures in both sexes.
- i) Journal Publications:
- 2701 West, R.J. 1989. Cone depredations by the red squirrel in black spruce stands in Newfoundland: implications for commercial cone collection. *Can. J. For. Res.* 19: 1207-1210.
- Grant, G.G., W.H. Fogal, R.J. West, K.N. Slessor and G.E. Miller. 1969. A sex attractant for the spruce seed moth and the effect of lure dosage and trap height on capture of males moths. *Can. Ent.* 121: 691-697.
- 2702 West, R.J. 1990. The biology, damage and within-tree distribution of the spruce bud midge on black spruce in Newfoundland. *Phytoprotection* 71: in press.
- 2707 Bowers, W.W. and J.H. Borden. 1990. Evidence for a male-produced aggregation pheromone in the four-eyed spruce bark beetle, *Polygraphus rufipennis* (Kirby) (Coleoptera: Scolytidae). (In Press, *Zeit. ang. Ent.*)
- Gries, G., W.W. Bowers, R. Gries, M. Noble and J.H. Borden. 1990. Pheromone production by the pine engraver *Ips pini* following flight and starvation. Accepted for publication in *Journal of Insect Physiology*.
- Bowers, W.W. 1989. Effective detection of the four-eyed spruce bark beetle. Poster presented at Forestry Research Marketplace: Results in Action. OFRC Symposium Proceedings O-P-18, 21-23 November 1989.
- 2708 Dobesberger, E.J. 1989. A sequential sampling plan for the management of the eastern hemlock looper, *Lambdina fiscellaria fiscellaria* (Lepidoptera: Geometridae), in Newfoundland. *Can. J. For. Res.* 19: 911-916.

- 2710 Raske, A.G. and B.E. Wickman. 1990. Toward Integrated Pest Management of Forest Defoliators - Introduction to the Symposium. *J. For. Ecol. and Management* 30: (in press).
- 2710 Raske, A.G. 1989. (Contribution to) Forestry research priorities in Canada. *For. Chron.*, Aug. 1989: 316 - 323. (Publ. by Forestry Research Advisory Council of Canada).
- 2712 West, R.J. and A.G. Raske. 1989. Developing alternative control strategies for operational use against the hemlock looper. Pastor, Forest Research Marketplace, OFRC Symposium Proceedings, O-P-18, Toronto, 21-23 November.

ii) Information Reports:

- 2701 West, R.J., ed. Proceedings, Cone and Seed Pest Workshop, 4 October 1989, St. John's, Nfld., Canada. ForCan, Newfoundland and Labrador Region, Info. Rep. N-X-274, 128 pp.
- West, R.J. and P. de Groot. 1990. Red squirrels and cone crops: damage and management. In *Proc., Cone and Seed Pest Workshop*. ForCan, Newfoundland and Labrador Region, Info. Rep. N-X-274, pp. 118-128.
- 2702 West, R.J., W.J. Kaupp and J.C. Cunningham. 1990. Aerial application of Virtuss, a nuclear polyhedrosis virus, against whitemarked tussock larvae in Newfoundland in 1987. ForCan, Info. Rep. N-X-270, 10 pp.

iii) Other Reports:

- 2701 West, R.J. 1989. Cone and seed pest workshop. *Canadian Tree Improvement Association News Bulletin* 12:10.
- West, R.J. and D.S. Durling. 1990. Red squirrel research in Newfoundland in 1989. ForCan, Newfoundland and Labrador Region, File Report, 4 pp.
- West, R.J. and K.M.S. Sundaram. 1990. First-year effects of ACECAP implants against cone insects of blackspruce in Newfoundland. File report prepared for Creative Sales, Inc., 8 pp.
- 2702 Shepherd, R.F. and R.J. West. Black army cutworm. In *Control of Forest Insects in Canada*, W.G.H. Ives and E.J. Mullins, ForCan, Ottawa. In press.
- Humble, L.M. and R.J. West. Gall midges. In *Control of Forest Insects in Canada*, W.G.H. Ives and E.J. Mullins, ForCan, Ottawa. In press.
- West, R.J. 1990. A new method of pest control - nematodes. *Woody Plants* 19(1): 6-7.

- West, R.J. and D.S. Durling. 1990. Black army cutworm research in Newfoundland in 1988 and 1989. ForCan, Newfoundland and Labrador Region, File Report, 9 pp.
- 2703 Harris, J.W.E. and W.W. Bowers. Woolly Adelgids: Research. In Control of Forest Insects in Canada (W.G.H. Ives and E.J. Mullins, eds.). ForCan, Ottawa. (in press.)
- 2705 Warren, G.R. 1989. The identities, roles, and interactions of the fungi associated with stem biodeterioration of balsam fir stressed and killed after spruce budworm defoliation in Newfoundland. Ph.D. Thesis, State University of New York, College of Environmental Sciences and Forestry, Syracuse, NY, 229 pp.
- 2707 Bowers, W.W., R.J. West and K.M.S. Sundarum. 1989. The effect of acephate (acecaps) and their residues on the four-eyed spruce bark beetle in black spruce trap trees. ForCan, Newfoundland and Labrador Region, File Report, prepared for Creative Salaes Inc., Study No. 2707, 38 pp.
- 2710 Raske, A.G. 1989. 1988 Annual Report. Canada-Newfoundland Forest Research Committee. For. Can., Newfoundland and Labrador Region, St. John's, NF., 10 pp.
- Raske, A.G. and R.J. West 1989. Newfoundland region hosts forestry tour. Woody Points 18(3): 5.
- 2711 Meades, J.W. 1990. (Contribution to) Pest Biology Project. Project Review Documentation. ForCan, Newfoundland and Labrador Region, Special report, St. John's, NF.
- 2712 Raske, A.G., R.J. West and A. Retnakaran. Eastern hemlock looper. In W.G.H. Ives and E.J. Mullins, eds. Control of Forest Insects in Canada. ForCan. (In press.)
- 2713 West, R.J., W.W. Bowers and J. Hudak. 1989. The hemlock looper: scientists unite to develop an early warning system. Woody Points 18(3): 3.

iv) Lectures, Seminars, and Scientific Addresses:

- 2701 West, R.J. and P. de Groot. 1989. Red squirrels and cone crops: damage and management. Annual meeting. Ent. Soc. Can. St. John's, Nfld. (4 October).
- West, R.J. 1989. Cone pests of Newfoundland. Rotary Club Luncheon, Stephenville. (26 April).
- West, R.J. 1989. Pests of Newfoundland forests. Lecture to 209W Forestry Class at Memorial University. St. John's, Nfld. (18 October).

- West, R.J. 1990. From squirrels to seedworms - cone and seed pests of Newfoundland. Biology Department Seminar at Memorial University. (31 January).
- 2702 West, R.J. and J. Finney-Crawley. 1989. Application of the entomogenous nematode *Steinernema* sp. against the black army cutworm: preliminary trials. National annual meeting, Ent. Soc. Amer. San Antonio, TX (5 December).
- West, R.J. 1990. Nematodes as alternative control agents. ForCan, Newfoundland and Labrador Region, (February).
- 2705 Warren, G.R. 1990. Deterioration and salvage of insect damaged balsam fir stands. CIF Mini-Forum, Corner Brook, Nfld., 24 January.
- Bowers, W.W. 1989. Bionomics and ecology of the four-eyed spruce bark beetle, *Polygraphus rufipennis* (Kirby) (Coleoptera: Scolytidae), in Newfoundland. Contribution to W-110 Working Group for publication In: Interactions among Bark Beetles, Pathogens, and Conifers in North American Forests.
- 2710 Raske, A.G. 1989. Reproductive Biology of the hemlock looper. Annual Meeting, Ent. Soc. Amer., San Antonio, TX, (December).
- Raske, A.G. 1989. The budworm and Armillaria root rot. Northeastern Forest Insect Work Conference, Hyannis, MA, (April).
- Raske, A.G. 1990. Recent progress in managing the hemlock looper. Northeastern Forest Insect Work Conference, Albany, NY, (March).
- Raske, A.G. 1990. The use of pheromones in forest pest management. Northeastern Forest Insect Work Conference, Albany, NY, (March).
- Raske, A.G. 1990. Graduate student research in Newfoundland. Northeastern Forest Insect Work Conference, Albany, NY (March).
- Raske, A.G. 1989. (Contribution to) Forestry research Advisory Council of Canada Annual Report for 1988. Forestry Research Advisory Council of Canada, Ottawa, ON. (also publ. in for. Chron., Aug. 1989: 316-323).
- 2712 West, R.J. 1990. Hemlock looper spray program. E5132 Engineering class. Memorial University, St. John's. (15 March).
- West, R.J. 1990. Hemlock looper biology and control. Faculty of Forestry. University of New Brunswick. (17 January).
- West, R.J. 1989. Hemlock looper spray program. Memorial University, St. John's. (30 October).

v) Other Technology Transfer:

- 2701 West, R.J. 1989. CFSX Radio interview on seed and cone pests, (Stephenville, 26 April).
- Raske, A.G. 1990. Priority of forestry research in Newfoundland. Contribution to report by the Forestry Research Advisory Council of Canada, Ottawa, ON.
- Raske, A.G. 1989. Progress in forest entomology research in Canada 1988, 6 pp.
- Raske, A.G. 1989. Forest protection research in Newfoundland. Report to the 13th Commonwealth Forestry Conference.
- 2713 West, R.J., W.W. Bowers and L. Jobin and J. Hudak. 1989. Research on pheromones and light traps to monitor populations of the hemlock looper. Forestry Canada Pheromone Working Group presentation. Ottawa, ON, (November).
- West, R.J. 1989. CKIX Radio interview on field studies, (25 September).
- West, R.J. 1989. CBC NEWS (Here and Now). 5-minute summary of field studies (15 September).
- West, R.J. 1989. CBC radio interview on experimental sprays (Corner Brook, 8 November).
- Bowers, W.W. 1990. Evening Telegram Interview on experimental sprays (January).

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2701	Publish results of squirrel research (1985-88).	Results published.	Complete acephate-implant study and draft publications on the results.	Conclude seed germination studies on the effects of insects on black spruce cones.	Publish results of seed germination studies.
	Initiate two year study on the efficacy of fall and spring implants of acephate against cone insects.	Study initiated. Interim report produced.	Evaluate efficacy of shooting squirrels as a control technique.	Initiate studies on major pests of seed orchards in Newfoundland as seed orchards become developed.	Continue work on handbook.
			Initiate production of a hand-book on cone pests in Newfoundland.	Continue work on handbook. Publish results of acephate study.	
	Organize workshop on cone and seed pests and publish proceedings.	Workshop held and proceedings published.	Draft an article on the use of an ATV-hauled ladder for cone work.		
	Continue germination studies.	Germination studies continued.			
	Evaluate effects of squirrel trapping	Squirrel trapping evaluated			

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2702	Evaluate controls against the black army cutworm.	Evaluation of nematodes as a control against the BAC initiated. Results presented at National Meeting of the Entomol. Soc. America. One-year effects of Ambush treatments evaluated. File report produced.	Continue work on Black army cutworm - damage and control. Draft article for publication on biology, damage and control. Draft fact sheet on BAC.	Continue BAC research. Field-test nematodes against BAC larvae in cooperation with Memorial University and BIOSYS. Initiate handbook on plantation pests in Newfoundland.	Continue BAC research. Continue work on handbook.
	Publish journal article on the spruce bud midge.	Journal article on SBM published.	Publish fact sheet on SBM		
	Publish information report on 1987 Virtuss spray trial.	Information report published.	Continue work on sclerodermis canker - infection biology and host specificity. Publication on wind desiccation damage in plantations.	Continue sclerodermis canker research - craft publication of results and recommendations for non-susceptible species selection	Continue sclerodermis canker research - report on infectivity and host specificity
	Evaluate response of spruce plantation to wind desiccation damage	Mortality assessment of damaged areas			
	Continue sclerodermis canker research	Identification of			

GOALS VS. ACHIEVEMENTS 1989/90 3 YEAR STUDY GOALS					
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2703	Continue to investigate the bionomics of balsam woolly adelgid	Sampling methods have been researched and employed to study distribution and biology of balsam woolly adelgid. Studies on the seasonal history and population dynamics of bwa continued.	Complete seasonal history studies. Analyse write and publish insect growth regulator study. Analyse preliminary results from seasonal history study. Continue population dynamics study.	Complete field work for population dynamics study. Analyse, write and publish seasonal history study. Initiate adelgid-host resistance study. Initiate aphid genetics study.	Analyse and publish population dynamics study. Continue resistance study. Complete aphid genetics study.
	Continue to investigate direct control strategies	Research on the use of insect growth regulators continued			
	Complete Book Chapter reviewing Adelgid research in Canada	Book Chapter on adelgid research accepted for publication			

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2706	Initiate top dieback and stem defects study for spruce budworm damaged fir	Preliminary samples collected and processed for young stems			
	Continue sampling for deterioration of hemlock looper killed balsam fir	Collected and processed samples for trees dead 2-3 yrs	Continue sampling for HL deterioration studies (trees dead 3-4 yr)	Continue sampling for HL deterioration studies (trees dead 4-5 yr)	Process data and publish results for deterioration of HL damaged fir
		Group Identify defect causing fungi	Publish results from logging salvage studies		
	Publish wood density report for commercial tree species.	Tables and report draft completed for wood density by prov. management units. SAS data sets prepared for site and stand classifications.	Publish wood density results.	Continue data analysis for regional forest stratification based on site & stand conditions.	Publish results on regional forest stratification. Prepare reports and tables for wood density and cull factors for regional forests.
	Transfer cull data for SAS analysis.		Continue data transformation and analysis for regional forest stratification based on site and stand conditions.	Complete any supplementary field sampling required for forest stratification.	
			Publish results from Mfld. and Labrador Hydro utility pole study.	Determine natural forest stand wood density and cull factors.	Publish results of natural stand wood density and cull factors.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2707	Complete study on the ecology of secondary woodborers. Publish findings generated from woodborer study. Continue to assist major clients, as required.	Study completed. Data analysed. Two manuscripts accepted for journal publication, two additional manuscripts are completed and submitted to journal, and two in preparation for journal publication. Information was transferred to client agencies	Complete publications	Continue studies on secondary woodborers.	Continue studies on secondary woodborers.
2708	Summarize and collate and analyse hemlock looper and spruce budworm population data. Assess endemic population levels of major defoliators.	Population data of both defoliators have been collected and preliminary analyses are completed. Endemic population levels of spruce budworm were sampled, and basic data collated.	Prepare population data for the spruce budworm and hemlock looper for publication. Analyze data on endemic population levels for preparation of sampling systems for these low levels.	Continue sampling populations of major defoliators and prepare data for publication	Continue sampling, manuscript preparation and publish results.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2709	Determine the biological mortality factors of the spruce budworm, and hemlock looper.	Seasonal data on biological mortality factors of spruce budworm and hemlock looper were collected and collated.	Continue to collect data of the biological factors of spruce budworm and hemlock looper. Collect data on the biological mortality factors of the eastern blackheaded budworm.	Continue and prepare for publications.	Continue and prepare for publications.
2711	Prepare report on plot measurements.	Preparation of report was delayed.	Prepare report on plot measurements	Remeasure succession plots	Prepare report of all measurements
2712	Draft journal papers and reports on 1986-88 field tests	Journal paper on Bt (1988) tests submitted. Information Report on 1987 tests drafted. Journal paper on 1986-88 dimilin tests in draft. Poster created summarizing insecticide efficacy tests against the hemlock looper. Presented at Forest Research Marketplace	Present poster at IURGO congress in Montreal. Finish reports on efficacy testing 1986-88.	Publish reports (1986-88 tests). Produce video summarizing 1986-88 tests.	Initiate additional testing as required

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2713	Apply for a strategic grant to develop an early warning system against the hemlock looper.	Biological studies initiated. Calling behaviour in field determined. Light trap data collected.	Draft articles and report on the calling behaviour of the hemlock looper. Isolate, identify and field-test candidate compounds. Field-test light traps. Publish and report on results when completed.	Continue.	Continue.

8. LONG TERM PROJECTIONS

The project has been an integral and major component of the research program since the inception of federal forestry research in the province. The increased demand for all benefits that forests produce and with expected decreases in timber supply this project will continue to be an important component of the total research picture in this province.

Studies on seed and cone pests and plantation pests will continue with the new emphasis they received in recent years. Germination tests of damaged cones by various agents will continue as will the study on the impact of red squirrel populations on the cone crop of black spruce trees. Chemical control attempts with systematic insecticides will be included in studies on the spruce bud midge.

Plans are to expand the research on various aspects of the balsam woolly adelgid problem, especially in recently thinned stands. The sampling system will be refined for young stands, and its ecology studied in such stands. Practical control methods will be investigated with new juvenile hormones that work well with other aphid genera.

Investigation into the deterioration of insect-killed trees will continue to form a part of the research program. Studies on spruce budworm killed fir will be published and those on black spruce are nearly completed.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Formal and informal working relationships have been established with the Newfoundland Department of Forestry and Agriculture. Problems have been cooperatively researched, beginning from the planning stage, to providing direct financial support and assistance in kind, to joint technology transfer activities. To a lesser extent other departments of the provincial government have cooperated with research on pest problems. Cooperation has also extended to the two pulp and paper companies, who have contributed finances and have given other assistance. Staff at Memorial University of Newfoundland have researched problems under contract to Forestry Canada, and cooperative work as extended to joint supervision of graduate student research. Such ties have also been created with Simon Fraser University and other Universities.

Staff of the Forest Pest Management Institute, and of other Regions of Forestry Canada have frequently joined in research efforts in Newfoundland, and research has also benefited from cooperation with several private companies, who have contributed finances and assistance in kind: Abbott Laboratories, Duphar B.V., Sumotoma Chemical of America, Zooncon Industries Ltd., Chem-agro Ltd., Newfoundland and Labrador Hydro, and others.

10. EVALUATIONS

Individual studies of this project are evaluated in-house annually by the Program Director and by researchers. A formal peer review involving headquarters personnel, Forestry Canada staff, outside experts, and Forestry Canada clients was held in April 1989. Suggested changes by the review panel will be incorporated as soon as feasible.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/27 [RR/PP]
 TITLE: PEST BIOLOGY RESEARCH
 RESP. CENTRE: 4161 LEADER: RASKE, A.G.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2232
 EVALUATION-PREV: 03/83 NEXT: 03/89

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$549.0	\$472.2	\$396.9	\$385.6	\$385.0	\$0.0	\$0.0
O&M	\$41.1	\$40.0	\$40.0	\$47.0	\$34.5	\$34.5	\$34.5
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$41.1	\$40.0	\$40.0	\$47.0	\$34.5	\$34.5	\$34.5
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$590.1	\$512.2	\$436.9	\$432.6	\$419.5	\$34.5	\$34.5

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	5.4	5.4	4.3	4.1	3.9	5.6	5.6
PY-O	6.5	6.5	7.1	7.1	7.5	6.5	6.5
TOTL	11.9	11.9	11.4	11.2	11.4	12.1	12.1

COOPERATORS RESOURCES (\$000)							
TOTL	\$1.7	\$1.7	\$1.7	\$1.3	\$1.7	\$1.7	\$1.7

DESCRIPTION
 POPULATION DYNAMICS OF FOREST PESTS AND THEIR EFFECT ON FOREST GROWTH,
 SURVIVAL AND SUCCESSION, AND THE DEVELOPMENT OF INTEGRATED PEST MANAGEMENT
 TECHNIQUES TO MINIMIZE FOREST LOSSES.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2234 BIOLOGICAL CONTROL RESEARCH

2. FORESTRY CANADA PROGRAM : 2200/2230

3. PROJECT PROFILE : 1990/91

Project Leader : K.P. LIM

Total A-Base P/Y's : 1.2

Total A-Base O&M : 15.0K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

Strategic Forest Sector Issues: 1, 2, 3, 5

Studies:

2801 POPULATIONS OF BIOLOGICAL CONTROL AGENTS

Study Leader : K.P. LIM

A-Base P/Y's : 0.8

A-Base O & M : 7.5K

Initiated : 1969

Other P/Y's : 0.0

Other O & M : 0.0

2802 CONTROL OF FOREST INSECT PESTS WITH NEMATODES AND FUNGI

Study Leader : K.P. LIM

A-Base P/Y's : 0.2

A-Base O & M : 5.0K

Initiated : 1982

Other P/Y's : 0.0

Other O & M : 0.0

2803 EFFECTS OF INSECTICIDES ON THE PARASITES OF THE HEMLOCK LOOPER

Study Leader : K.P. LIM

A-Base P/Y's : 0.2

A-Base O & M : 2.5K

Initiated : 1985

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

Some pest insects damage the forests or ornamental trees. Biological control, the use of parasites, predators or pathogens to regulate pest populations to tolerable levels, is one component of an insect pest management program.

5. OBJECTIVES

a) Project Objectives

- 2234 To develop effective biological control of forest insect pests; investigate the potential of entomogenous nematodes and fungi as microbial control agents for forest insect pests; evaluate the possible side-effect of chemical sprays on biological control agents of forest insect pests.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Biological control studies of forest insect pests in Newfoundland are not new. They began in the 1930s and have been conducted against the following 12 insect species: spruce budworm, hemlock looper, eastern blackheaded budworm, balsam woolly aphid, satin moth, European spruce sawfly, European pine sawfly, birch casebearer, birch leafminer, larch casebearer, larch sawfly and the mountain-ash sawfly.

b) Study Objectives

- 2801 To introduce and release biological control agents against forest insect pests; assess establishment and dispersal of the introduced biocontrol agents; evaluate the effectiveness of the introduced biocontrol agents.
- 2802 To investigate the use of entomogenous nematodes and fungi as microbial control agents for forest insect pests.
- 2803 To determine the effects of field applications of insecticides, particularly fenitrothion, on parasites of the hemlock looper.

b) Project Highlights, 1989/90

- 2234 2801 Dispersal pattern and effectiveness of the introduced parasite, Olesicampe geniculatae Quednau and Lane, of the mountain-ash sawfly, Pristiphora geniculata (Hartig), was studied in St. John's. Percent parasitism of P. geniculata was also determined at selected areas in Newfoundland.

More than 4000 larvae and pupae of birch casebearer were collected from 9 locations and reared in the laboratory. About 30 percent of the samples were parasitized. Identifications of the parasites are pending.

- 2802 Reports on the use of nematodes to control forest insects are in preparation by our contractor, Dr. J. Finney-Crawley.
- 2803 The flight activities and densities of the introduced tachinid parasite Winthemia occidentis were monitored with Malaise traps in Castor's River, Eddie's Cove and Baie Verte. Identifications and evaluations of data are in progress.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

- 2801 Lim, K.P., P.L. Dixon and F.W. Quednau. 1990. Introduction, establishment and dispersal of Olesicampe geniculatae (Hymenoptera: Ichneumonidae), a parasite of the mountain-ash sawfly, Pristiphora geniculata (Hymenoptera: Tenthredinidae), in Newfoundland. USDA APHIS Publ.

iv) Lectures, Seminars, and Scientific Addresses:

- 2801 Lim, K.P. and P.L. Dixon. 1989. Diagnosis of diseases of forest insects in Newfoundland. 1980-89. Presented at the 1989 Annual Meeting of the Entomological Society of Canada, 2-4 Oct., St. John's, Newfoundland.

v) Other Technology Transfer:

- 2801 Dixon, P.L. and K.P. Lim. 1989. Biological control of forest pests in Newfoundland. Woody Points 18:7.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2801	To introduce and evaluate exotic parasites and predators of forest insect pests	1. Dispersal pattern and effectiveness of an introduced parasite of the mountain-ash sawfly was studied in St. John's. 2. Parasites of the birch casebearer were reared and emerged from samples collected from 9 sites.	1. To continue monitoring the dispersal and evaluate the effectiveness of the introduced parasite of the mountain-ash sawfly. 2. To study the current status of the introduced parasites of the birch casebearer and birch leafminer.	1. Continue analysis of data. 2. Continue.	1. Prepare publication. 2. Continue.
2803	To evaluate the effect of aerial chemical sprays on the parasites of the hemlock looper.	The flight activities and densities of the introduced tachinid parasite of the hemlock looper were monitored with Malaise traps.	3. To introduce exotic parasites of spruce budworm. Continue, if spray program is on.	3. Continue Continue.	3. Continue Continue.

8. LONG TERM PROJECTIONS

- 2234 To conduct research on biological control agents, including parasites, predators and pathogens, of forest insect pests. Research knowledge will then be applied in forest pest management programs.
- 2801 Emphasize the introduction and evaluation of insect parasites and predators of forest insect pests.
- 2802 To investigate the potential use of entomogenous nematodes and fungi as microbial control agents of forest insect pests.
- 2803 To determine the effects of aerial sprays of chemical insecticides on parasites of the hemlock looper.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2234 V. Nealis, D. Wallace, Forestry Canada, Ontario Region;
F.W. Quednau, Forestry Canada, Quebec Region;
J.C. Cunningham, W. Kaupp, D. Tyrrell, G. Wilson, Forest Pest Management Institute;
J.R. Finney-Crawley, R. Gordon, R.A. Nolan, Memorial University of Newfoundland;
J. Kelleher, Biosystemics Research Centre, Agriculture Canada, Ottawa;
N.J. Mills, Commonwealth Institute of Biological Control;
Newfoundland Department of Forestry and Agriculture;
Newfoundland Department of Environment;
Abitibi-Price Inc.;
Corner Brook Pulp and Paper Ltd.

10. EVALUATIONS

- 2234 Individual studies of this project are evaluated in-house twice annually by the Program Director and researchers. Progress was reviewed at a formal Project Review in March, 1988. Next review will be in 1991.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #:	01/28	[RR/PP]		
TITLE:	BIOCONTROL RESEARCH			
RESP. CENTRE:	4161	LEADER:	LIM, K.P.	
PROGRAM:	00	STATUS:	A (A/I/F/D)	
EVALUATION-PREV:	03/83	NEXT:	03/89	
			SUB-ELEMENT: 2334	

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89		1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)								
SAL	\$82.2	\$42.4	\$50.7	\$53.7	\$24.3	\$0.0	\$0.0	\$0.0
O&M	\$3.9	\$5.0	\$5.0	\$15.0	\$7.5	\$7.5	\$7.5	\$7.5
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$3.9	\$5.0	\$5.0	\$15.0	\$7.5	\$7.5	\$7.5	\$7.5
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$86.1	\$47.4	\$55.7	\$68.7	\$31.8	\$7.5	\$7.5	\$7.5

PERSON YEARS - PROFESSIONAL & OTHER								
PY-P	0.5	0.5	0.6	0.6	0.2	0.5	0.5	0.5
PY-O	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7
TOTL	1.0	1.0	1.2	1.2	0.9	1.2	1.2	1.2

COOPERATORS RESOURCES (\$000)								
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION

POPULATION DYNAMICS OF BIOCONTROL AGENTS IN RELATION TO POPULATIONS OF THEIR HOSTS AND THE DEVELOPMENT OF FOREST PEST CONTROL METHODS USING BIOLOGICAL CONTROL FACTORS.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1989/90 - 1991/92

1. PROJECT : 2251 GENERAL RESEARCH SUPPORT

2. FORESTRY CANADA PROGRAM : 2200/2250

3. PROJECT PROFILE : 1990/91

Project Leaders	: R.S. VAN NOSTRAND AND J. HUDAK	
Total A-Base P/Y's	: 6.3	Total Other P/Y's : 1.0
Total A-Base O&M	: 111.5K	Total Other O&M : 0.0

Studies:

601 SEED AND PLANTING STOCK SUPPLY SERVICE

Study Leader	: A. ROBERTSON	
A-Base Person Years	: 0.3	Other P/Y's : 0.0
A-Base O & M Budget	: 3.0K	Other O&M : 0.0
Initiated	: 1965	

602 CHEMICAL AND PHYSICAL ANALYSIS LABORATORY

Study Leader	: D. TRENHOLM	
A-Base Person Years	: 2.5	Other P/Y's : 0.0
A-Base O & M Budget	: 18.0K	Other O&M : 0.0
Initiated	: 1957	

603 BOTANICAL HERBARIUM

Study Leader	: S. MORGAN	
A-Base Person Years	: 0.1	Other P/Y's : 0.0
A-Base O & M Budget	: 0.5K	Other O&M : 0.0
Initiated	: 1957	

604 GREENHOUSE

Study Leader	: G. MILLS	
A-Base Person Years	: 1.0	Other P/Y's : 1.0
A-Base O & M Budget	: 20.0K	Other O&M : 0.0
Initiated	: 1982	

701 COMPUTER SERVICES

Study Leader	: ROBYN THOMPSON	
A-Base P/Y's	: 3.0	Other P/Y's : 0.0
A-Base O & M	: 70.0	Other O&M : 0.0
Initiated	: 1979	

702 MYCOLOGICAL HERBARIUM

Study Leader : G.C.CAREW

A-Base P/Y's : 0.6

A-Base O & M : 0.5K

Initiated : 1961

Other P/Y's : 0.0

Other O&M : 0.0

703 INSECT REFERENCE COLLECTION

Study Leader : K.E. PARDY

A-Base P/Y's : 0.2

A-Base O & M : 0.5k

Initiated : 1952

Other P/Y's : 0.0

Other O&M : 0.0

4. PROBLEM DEFINITION

Support services include (1) Seed and planting stock supply service, (2) Chemical and Physical Analyses Laboratory, (3) Botanical herbarium, (4) Greenhouse facilities, (5) Computer services, (6) Mycological herbarium, (7) Insect reference collection. These services are essential for the operation of the ForCan - NLR research and development program.

5. OBJECTIVES

a) Project Objectives

To provide efficient and high quality support services to meets the needs of the research and development program of the Newfoundland and Labrador Region.

b) Study Objectives

- 601 To maintain a research nursery and provide planting stock for research plantations.
- 602 To conduct chemical and physical soil and related vegetation analyses in support of research studies.
- 603 To maintain and improve a comprehensive botanical herbarium of the Newfoundland and Labrador Region.
- 604 To provide a modern, well-maintained and reliable greenhouse facility for conducting scientific studies.
- 701 To manage and provide support for all computing related operations; to provide systems (technical) support for all hardware and software on the VAX 8350.
- 702 To identify and classify forest disease samples and maintain the forest pathology herbarium of the Newfoundland and Labrador Region.
- 703 To maintain and improve a comprehensive collection of the forest insect fauna of Newfoundland and Labrador.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

The seed and planting stock supply service has been operational since 1967 and includes the seedbank and nursery facilities which provide seed and planting stock for experimental use. The Chemical and Physical Analyses Laboratory has been in operation since 1969 and in recent years has expanded considerably to meet the expanding requirements of forest resources and protection research. The botanical herbarium, established in 1956, now contains a specialized collection of plants (e.g.) Cyperaceae, peatland flora, native and exotic dendroflora) and the collection is registered in Index Herbariorum; a computer inventory of vascular and non-vascular plants is available; the herbarium is continuously being upgraded to National Herbarium Standards. The greenhouse facility - an automated complex was established in 1982. The facility is utilized for research experiments.

The computing service facility has grown from one desk-top computer for one year in 1979 to a VAX 8350 and many users. The quantity and complexity of services has increased correspondingly.

The two reference collections housed in the centre contain specimens of major and minor pests, and many incidental forest organisms. The collections are supplemented by slides, displays, and material set aside for special demonstrations.

b) Project Highlights, 1989/90

- 601 Produced cuttings for the Salix energy plantation trials, and larch planting stock for genetics research outplantings.
- 602 Computerization of many functions was significantly improved to increase the number of samples processed and to facilitate access by researchers to results of analyses.
- 603 Made loans of material to other Canadian herbariums.
- 701 A communications system was installed allowing most of the staff easy access to the VAX, which has encouraged additional people to use the system. As a result, additional training has been offered. The datapac service was upgraded, new modems obtained and several PC's purchased. Many staff received a three-day training course in WPS-PLUS.
- 702 The size of the mycological museum keeps growing and additional specimen were added in 1989. Several species of root rot fungi belonging to Amillaria mellia species complex occur in Newfoundland. The species of Scleroderis occurring on Sitka spruce on the Northern Peninsula has been identified as a new strain. Many extension calls were made.
- 703 Many specimens were added to the insect reference collection because of the extensive use of malaise traps. Many of these insects have been identified and have increased the number of diptera and hymenoptera significantly. Many extension calls were made.

c) Information and Technology Transfer, 1988/89

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

- 702 Carew, G.C. 1990. Tar spot of mountain holly, new to Newfoundland. Forestry Canada. Newfoundland and Labrador Region. Woody Points, 19: 8.

iv) Lectures, Seminars, and Scientific Addresses:

- 703 Attended seminars at Memorial University. Attended National meeting of Canadian Entomological Society, St. John's NFLD. Oct 2-4 1989.

v) Other Technology Transfer:

- 701 Continued to publish an Informatics Newsletter at regular intervals. Provided various training sessions for VAX related operations.
- 702 A talk and slide presentation on forest diseases was given at a teachers seminar-workshop in the Terra Nova integrated school board system. Five display cases of forest diseases were prepared for use in the classroom.
- Assistance was given with a Forestry Canada display in Agriculture Canada's Open House held in Mount Pearl. Numerous extension calls and visits were made throughout Newfoundland regarding tree disease problems.
- 703 A talk on forest insects was given to ten teachers in the Terra Nova Integrated School Board System. Five display cases of forest insects were prepared for use in the classroom. Assistance was given to the Forestry Canada display at Stephenville during national forest week May 8-12, 1989. Numerous extension calls and visits were made in the St. John's area.

7. PROJECT GOALS BY STUDY:

STUDY	GOALS vs. ACHIEVEMENTS 1988/89		3 YEAR STUDY GOALS		
	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
601	Provide seed and planting stock as required	Completed	Same	Same	Same
602	Computerize and update laboratory facilities	completed	Update facilities to speed up routine analyses and expand into organic chemistry analyses	Same as 1989-90	Same as 1989-90
603	Expand collection and make loans as required	Substantial loan made to Montreal herbarium	Continue to enlarge herbarium and make loans as requested	Same as 1989-90	Same as 1989-90
604	Continue to upgrade and modernize	Maintained service to researchers	Continue to upgrade and modernize	Same as 1989-90	Same as 1989-90

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93	
701	Routine programming, assistance with various computer related operations, training.	Provided as requested or needed for system improvement.	1, 3 and 4 from above. Plus: To evaluate the CA*net system and the possibility of joining a local network connecting to it.	1, 3, 4 from 1989/90. Plus: To improve networking abilities where feasible. To continue to evaluate new products and make recommendations for acquiring new systems.	As 1991/92. Plus: To keep up to date with technology and recommend changes when appropriate and feasible.	
	Three-year strategy plan	Information Management plan contains plans for the current and upcoming two years.	To evaluate various products (Wordperfect for VAX, Keyword for VAX, Vivid Graphics for VAX, Perfect Exchange for PC's, All-in-One for VAX). To evaluate systems to replace AES Word processing systems.			
	Software licenses, maintenance contracts, etc.	Reviewed and renewed as appropriate.				
	Training for computing staff	Both attended "Intro to Data Communications". Need more VAX training.				
	Communications	Improvements made to existing system. PC graphics usage has increased.				
	Graphics					

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
702	To update, identify and classify disease samples for the forest pathology mycological herbarium.	50 mycological specimens have been added in 1989, increasing the total number to 2850. 185 specimens of major diseases are maintained in display mounts, of which there were five new specimens for 1989. New disease specimens recorded were <u>Didymascella</u> needle blight of eastern white cedar and <u>Rhytisma</u> ink spot of mountain holly. A new host record included <u>Entomosporium</u> leaf blight of American Mt-ash. New additions to a slide collection were included.	To continue to add disease specimens to the mycological herbarium. To identify new disease specimens. To publish new records of diseases.	Same	Same

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
703	Maintain & improve the insect collection including slides, displays & demonstration material.	Progress was made in all phases of maintaining and improving the collection.	Same		
	To maintain at least the same level of support as in past years with improvements to these services when resources permit.				

8. LONG TERM PROJECTIONS

Improve all phases of electronic data processing by upgrading to new hardware and software as it becomes available, provide additional training to staff, increase staff and improve services to the various facets of this research centre.

Continue to maintain and improve the reference collections and the service that originate with them.

The Chemical and Physical Analyses Laboratory will continue to be upgraded to handle the expected increased demand from researchers, particularly in the field of organic chemistry. The increased reliability of the greenhouse control is expected to result in better utilization of this facility by researchers. The full-time greenhouse technician will be obtained in 1990/91. The Pasadena nursery will continue to provide planting stock for research studies and to provide space for small-scale short-term planting trials.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Service contracts are in place or close cooperations is maintained with Digital Equipment of Canada, SAS Institute, Relational Technology (INGRESS), and Ultimate Data Communications Ltd.

Close cooperation exists with staff at the Biosystematics Research Centre, in Ottawa, with the Food Production and Inspection Branch of Agriculture Canada, and with staff of Memorial University of Newfoundland.

Seed and planting stock supply service cooperates with the Provincial Forestry Forest Tree Nursery with the Department of Forestry and Agriculture and the two pulp and paper companies. The Chemical and Physical Analyses Laboratory cooperates with Provincial Department of Forestry and Agriculture, Agriculture Canada Research Station, services of Environment Canada, Fisheries and Oceans, and the Provincial Department of Environment. The Botanical Herbarium is registered with Index Herbariorum, an international agency. The Greenhouse facility cooperates with researchers at Memorial University, and Agriculture Canada Research Station.

10. EVALUATIONS

Formal evaluations are not held, but in-house reviews are conducted annually.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADA

INTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/06 [RR/PP]
TITLE: COMMON RECH - TECH. SUPPORT
RESP. CENTRE: 4162 LEADER: VAN NOSTRAND, R.S.
PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2251
EVALUATION-PREV: 00/00 NEXT: /

	1988-89	1989-90	1990-91				
	ACTUAL	BUDGET	REVISED	UPCOMING	PLANNING	PLANNING	PLANNING
	31/03/89	01/04/89	01/04/89	00/00/00	YEAR 1	YEAR 2	YEAR 3

FINANCIAL RESOURCES (\$000)							
SAL	\$140.4	\$136.9	\$90.6	\$84.5	\$110.6	\$0.0	\$0.0
O&M	\$31.3	\$37.1	\$37.1	\$41.5	\$27.5	\$27.5	\$27.5
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$31.3	\$37.1	\$37.1	\$41.5	\$27.5	\$27.5	\$27.5
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$171.7	\$174.0	\$127.7	\$126.0	\$138.1	\$27.5	\$27.5

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	1.1	1.1	1.0	1.0	1.0	1.0	1.0
PY-O	2.6	2.6	1.4	1.4	2.2	2.7	2.7
TOTL	3.7	3.7	2.4	2.4	3.2	3.7	3.7

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
PROJECT TO PROVIDE AN EFFICIENT AND HIGH QUALITY SUPPORT SERVICE TO MEET THE NEEDS OF THE NEFRC RESEARCH AND DEVELOPMENT PROGRAM.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY
CANADA

INTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/07 [RR/PP]
TITLE: RESEARCH TECHNICAL SERVICES SUPPORT
RESP. CENTRE: 4161 LEADER: HUDAK, J.
PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 2251
EVALUATION-PREV: 03/83 NEXT: 03/89

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	---------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$113.0	\$109.2	\$119.5	\$106.1	\$96.3	\$0.0	\$0.0
O&M	\$76.1	\$65.0	\$65.0	\$71.0	\$35.5	\$35.5	\$35.5
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$76.1	\$65.0	\$65.0	\$71.0	\$35.5	\$35.5	\$35.5
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$189.1	\$174.2	\$184.5	\$177.1	\$131.8	\$35.5	\$35.5

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	2.0	2.0
PY-O	2.5	2.5	3.8	3.8	2.5	0.5	0.5
TOTL	2.5	2.5	3.8	3.8	2.5	2.5	2.5

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
DATA PROCESSING AND STATISTICAL ANALYSIS SERVICES, AND REFERENCE COLLECTIONS IN SUPPORT OF ON-GOING RESEARCH.

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 2311 FOREST INSECT AND DISEASE SURVEY

2. FORESTRY CANADA PROGRAM : 2300/2310

3. PROJECT PROFILE : 1990/91

Project Leader : L.J. CLARKE AND G.C. CAREW

Total A-Base P/Y's : 6.8

Total Other P/Y's : 0.0

Total A-Base O&M : 35.0K

Total Other O&M : 0.0

Strategic Forest Sector Issues: 1, 2, 3, 5

Studies:

2901 DETECTING & FORECASTING FOREST PEST CONDITIONS

Study Leader : L.J. CLARKE, G.C. CAREW

A-Base P/Y's : 6.8

Other P/Y's : 0.0

A-Base O & M : 35.0K

Other O & M : 0.0

Initiated : 1952

4. PROBLEM DEFINITION

2311 Annual detection, monitoring, and assessment of forest insects and diseases, air pollutants and other damaging agencies are essential for intensive management of the forest. Comprehensive systematic surveys and assessments of natural control factors are necessary for forecasting impending outbreak conditions. Data on all aspects are required to interpret the effects of insect outbreaks and for substantiating, planning and initiating direct control. Forest Insect and Disease Survey data are also essential for the National Forest Resource Data program, particularly as it relates to pest losses. When control and management programs are conducted against forest pests, advisory services are provided to control and management agencies on the timing of applications of treatment and subsequent evaluation of its effectiveness.

The annual forest depletion by insect and disease organisms continue to increase as forest stands become damaged by defoliating larvae, bark beetles, foliage diseases, root rots, and stem rots. Government and forest industry require current information and advice on the nature, trends and impact of these forest pests to conduct protection programs and salvage operations. Guidelines and recommendations are also required by personnel from federal and provincial parks, municipalities and other citizens concerned with the care and protection of trees and shrubs growing in natural stands, plantations, tree nurseries, parks and recreational areas.

5. OBJECTIVES

a) Project Objectives

- 2311 To continue annual surveys of forest pest conditions, determine the extent of infestations, assess the impact, forecast impending conditions, and recommend control measures, and when necessary evaluate the effectiveness of direct control measures; provide forest pest data and related information for the National Forest Resource Data program of Canada and other national and regional reports.

b) Study Objectives

- 2901 (1) To determine the seasonal and geographic distribution and abundance of forest pests and access the intensity of damage and forecast future pest conditions.
- (2) To provide technical advice, information and instruction to forest managers, park personnel, industry and the general public on forest pest conditions and recommend control measures.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 2311 Annual monitoring, detecting, forecasting and appraising forest pest conditions and dissemination of the information to the appropriate agencies has been an on-going priority since 1952. Since that time data have also been provided on pest conditions for incorporation into national and international reports and statistics.

Aerial surveys of defoliation, egg and larva surveys have been done annually to forecast populations to provide forest management agencies to formulate protection measures to minimize forest losses. Areas of high population levels caused by the balsam woolly adelgid are surveyed, especially in thinned and unthinned young balsam fir stands. These stands were also surveyed for damage to trees.

Practical and reliable sampling systems have been developed including a system based on overwintering eggs to forecast the extent and severity of hemlock looper defoliation and blackheaded budworm populations.

b) Project Highlights, 1989/90

- 2311 The annual general detection, monitoring, appraisal and forecast of forest insects and diseases have been completed, the data analyzed and interpreted, and presented to forest resource managers in the form of publications, reports, special seminars and meetings.

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

- 2901 Singh, Pritam, and G.C. Carew. 1989. Impact of eastern dwarf mistletoe in black spruce forests of Newfoundland. *Eur. J. For. Path.* 19 (5-6): 305-322.

ii) Information Reports:

- 2901 Clarke, L.J. and G.C. Carew. 1989. Forest insect and disease conditions in Newfoundland and Labrador in 1988. Forestry Canada. Newfoundland and Labrador Region. Info. Rep. N-X-268, 38 pp.
- Clarke, L.J. J. Hudak, and A.G. Raske. 1990. (Contribution to) Alert, 50th Anniversary Issue, Forest Insect and Disease Survey. Forestry Canada, Ottawa, ON. 27 pp.

iii) Other Reports:

- Bowers, W.W. and A.G. Raske. 1989. Pinewood nematode surveys. Report to the 17th Annual Forest Pest Control Forum, Ottawa, 14-16 November, 1989.
- 2901 FIDS Annual Report Hudak, J., L.J. Clarke and G.C. Carew. 1989. Forest insect and disease conditions in Canada in 1988 - Newfoundland Region. In Annual Report of FIDS, Forestry Canada, Ottawa (compiled by B. Moody). Forum Report
- Hudak, J., G.R. Warren and G.C. Carew. 1989. The scleroderris canker in Newfoundland in 1989. Report to the 17th annual Forest Pest Control Forum, Ottawa, 14-16 November, 1989 Forestry Canada, Ottawa, ON. Newfoundland Forest Protection Association
- Clarke, L.J. and G.C. Carew. 1989. Forest insect and disease conditions in Newfoundland and Labrador in 1989. In annual report of the Newfoundland Forest Protection Association, Forestry Canada Report. Forestry Canada, St. John's, Newfoundland.

v) Other Technology Transfer:

- 2901 Woody Points
- Clarke, L.J. and G.C. Carew. 1989. Forest insect and disease conditions in Newfoundland and Labrador in 1989. Forestry Canada. Newfoundland and Labrador Region. Woody Points 18(3): 6-10.

Miscellaneous

Carew, G.C. 1989. Forest disease conditions. Rept. to the 30th N.E. Forest Pathology Workshop, Hyannis, Massachusetts, USA. 1989. 4 pp.

Clarke, L.J. and G.C. Carew. 1989. Forecast of forest insect conditions in Newfoundland and Labrador in 1989. (Press report) The Sunday Express, Vol.3, No.3, St. John's, Newfoundland. Sunday, May 7, 1989. pp. 40.

Clarke, L.J. and G.C. Carew. 1989. Forecast of forest insect and disease conditions. (Press report) Western Star, Corner Brook, Newfoundland. May 8, 1989.

GOALS VS. ACHIEVEMENTS 1989/90		3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
2901	Continue surveys for pest conditions, appraising and forecasting. Provide local data bank on forest pests To continue special surveys	Surveys for major and minor pests were completed, their damage appraised, and forecasts provided for major pests. Size of data bank was increased with insect and disease records. Several special surveys were completed.	Continue surveys. Provide further data. Continue special surveys.	Same.	Same.

8. LONG TERM PROJECTIONS

- 2311 The Forest Insect and Disease Survey will continue to provide extensive and detailed forest pest information for all major and most minor pests to all client agencies, and for national programs. This information includes pest densities, geographic distribution, other damage estimates, impact assessment, and forecasting. FIDS will continue to provide technical advice, instructions, and when necessary evaluate effectiveness of control measures.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 2311 Formal and informal cooperation is maintained with the Department of Forestry and Agriculture who provided aircraft time and manpower for general and special aerial surveys. Informal cooperative working arrangements exist with Corner Brook Pulp and Paper Ltd., Abitibi-Price of Newfoundland and Agriculture Canada.

10. EVALUATIONS

- 2311 The project is reviewed annually in-house by management and research staff, and also receives evaluation from industrial and government representatives through the Newfoundland Forestry Research Advisory Committee. The project was formally reviewed in April 1988. Contributions to this were presented to forestry staff of the Newfoundland Department of Forestry and Agriculture in a seminar in Gander in May 1988.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #:	01/29	[RR/PP]		
TITLE:	FIDS			
RESP. CENTRE:	4161	LEADER:	HUDAK, J.	
PROGRAM:	00	STATUS:	A (A/I/F/D)	SUB-ELEMENT: 2311
EVALUATION-PREV:	03/83	NEXT:	03/93	

	1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
--	-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$192.0	\$228.6	\$235.5	\$224.1	\$211.1	\$0.0	\$0.0
O&M	\$28.4	\$40.0	\$40.0	\$35.0	\$32.4	\$32.4	\$32.4
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$28.4	\$40.0	\$40.0	\$35.0	\$32.4	\$32.4	\$32.4
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$220.4	\$268.6	\$275.5	\$259.1	\$243.5	\$32.4	\$32.4

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PY-O	6.5	6.5	6.7	6.7	6.3	6.3	6.3
TOTL	6.6	6.6	6.8	6.8	6.4	6.4	6.4

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION

DETECTION, IDENTIFICATION, AND MONITORING OF FOREST PESTS FORECASTING IMPENDING PEST OUTBREAKS, ASSESSING THEIR DAMAGE TO FOREST ENVIRONMENT, AND RECOMMEND FEASIBLE CONTROL METHODS.

TECHNOLOGY CENTRES POLICY (\$000)		
A	Contracting-In	\$. (External Agencies)
B	Grants and Contributions	\$. (External Agencies)
C1	In-Kind Contributions	\$. (Forestry Canada)
C2	In-Kind Contributions	\$. (External Agencies)
D	Royalties and Licenses	\$. (External Agencies)

3000 - FORESTRY DEVELOPMENT

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 3111 PROGRAM MANAGEMENT

2. FORESTRY CANADA PROGRAM : 3100/3110

3. PROJECT PROFILE : 1990/91

Project Leader : J.M. BUTLER

Total A-Base P/Y's : 2.0

Total A-Base O&M : 25.0K

Total Other P/Y's : 0.0

Total Other O&M : 0.0

Strategic Forest Sector Issues: 2, 3, 5, 8, 9

4. PROBLEM DEFINITION

In 1982, Forestry Canada was given responsibility for administering existing cost-shared federal-provincial forestry agreements and for the development of new agreements within the forestry sector. In response to this new mandate, a Forestry Development Branch was established as part of the Forestry Canada organization. In the Newfoundland and Labrador region, the Forestry Development Branch is under the direction of a Program Director with one secretarial support person. In addition, there are currently two professional staff permanently attached to the unit, occupying two person years. Contract staff are also added in support of other programs.

5. OBJECTIVES

a) Project Objectives

To provide management and common support services to the Forestry Development Branch, Newfoundland and Labrador Region and to discharge the responsibilities of the branch.

b) Study Objectives

Nil

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

Since taking on the responsibility for administering cost-shared federal provincial agreements, one agreement (FSA-II) was completed and another (FRDA) is in the final pay-out year. A further comprehensive agreement was recently approved. Included in the agreement is a separate forestry component which will require some ForCan involvement. Existing staff and contractors of professional services have and will continue to discharge branch responsibilities related to these activities.

b) Project Highlights, 1989/90

Nil

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports:

Nil

iii) Other Reports:

Nil

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

Nil

8. LONG TERM PROJECTIONS

Nil

9. MAJOR COOPERATORS AND CLIENT AGENCIES

Nil

10. EVALUATIONS

The program is subject to periodic in-house review to evaluate performance and establish priorities for new initiatives.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/49 [RR/PP]
 TITLE: PROGRAM MANAGEMENT
 RESP. CENTRE: 4151 LEADER: BUTLER, J.M.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 3111
 EVALUATION-PREV: 00/00 NEXT: 00/00

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

----- FINANCIAL RESOURCES (\$000) -----

SAL	\$86.9	\$86.4	\$86.4	\$80.7	\$0.0	\$0.0	\$0.0
O&M	\$18.9	\$15.0	\$15.0	\$25.0	\$25.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$18.9	\$15.0	\$15.0	\$25.0	\$25.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$105.8	\$101.4	\$101.4	\$105.7	\$25.0	\$0.0	\$0.0

----- PERSON YEARS - PROFESSIONAL & OTHER -----

PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	2.0	2.0	2.0	2.0	0.0	0.0	0.0
TOTL	2.0	2.0	2.0	2.0	0.0	0.0	0.0

----- COOPERATORS RESOURCES (\$000) -----

TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
------	-------	-------	-------	-------	-------	-------	-------

----- DESCRIPTION -----
 MANAGEMENT AND SUPPORT FOR DEVELOPMENT GROUP.

----- TECHNOLOGY CENTRES POLICY (\$000) -----

A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 3235 FORESTRY YOUTH TRAINING COOPERATION AGREEMENT

2. FORESTRY CANADA PROGRAM :

3. PROJECT PROFILE : 1990/91

Project Leader : J.M. BUTLER

Total A-Base P/Y's : 1.0

Total A-Base O&M : 100.0K

Total Other P/Y's : 0.0

Total Other O&M : 2.515M

Strategic Forest Sector Issues: 3

Studies:

4001 ON-SITE PROGRAM: FORESTRY YOUTH TRAINING

Study Leader : J.M. BUTLER

A-Base P/Y's : 0.0

A-Base O & M : 0.0

Initiated : 1990

Other P/Y's : 0.0

Other O & M : 2.515M

4002 FORESTRY YOUTH TRAINING PROGRAM ADMINISTRATION

Study Leader : J.M. BUTLER

A-Base P/Y's : 1.0

A-Base O & M : 50.0K

Initiated : 1990

Other P/Y's : 0.0

Other O & M : 0.0

4003 COMMUNICATIONS: FORESTRY YOUTH TRAINING

Study Leader : D.R. REX

A-Base P/Y's : 1.0

A-Base O & M : 50.0K

Initiated : 1990

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

3235 After a series of meeting amongst government departments, the private sector and trade unions, it was identified that Newfoundland lacked adequate skilled silviculture workers required for increased forest management activities. Accordingly, with the cooperation and support of several federal and provincial governments including ACOA, CEIC, ForCan and the provincial Department of Forestry, and the pulp and paper industry, the Newfoundland and Labrador Forestry Training Association was established. Its mandate is to develop the Forestry Youth Training Program which will effect the training of young Newfoundlanders and Labradorians in silviculture techniques.

5. OBJECTIVES

a) Project Objectives

- 3235 To produce 325 trained silviculture workers over the three years of the program. ForCan will monitor and administer the training program on behalf of the federal government.

b) Study Objectives

- 4001 To provide for the on-site portion of the forest worker training program. Participants will learn field techniques from qualified trainers.
- 4002 To provide for the management and administration of the Canada-Newfoundland and Labrador Forestry Worker Training Association Cooperation Agreement.
- 4003 To provide for the communications of this project.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 3235 This is a new study whose objective is the training of Newfoundlanders as silviculture workers. This is a three-year study.

b) Project Highlights, 1989/90

- 3235 This is a new project.

c) Information and Technology Transfer, 1989/90

i) Journal Publications

Nil

ii) Information Reports

Nil

iii) Other Reports

Nil

iv) Lectures, Seminars, and Scientific Addresses

Nil

v) Other Technology Transfer

- 4001 Local trainers have undergone intensive training provided by Nordfor experts. Training of program participants ongoing.
- 4002 The training program will result in the training of up to 325 silviculture workers by the end of the three year period.
- 4003 Communications program planning occurred in 1989/90. As funding becomes allocated in 1990/91, project delivery will begin.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS		
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93
	Over the period the Cooperation Agreement is in effect, it is anticipated that 325 silviculture worker trainees will successfully complete the program in addition, a secondary benefit will be the silviculture treatment of approximately 10,000 hectares of forest land. Training techniques developed here may be incorporated in industry and government programs within and outside the province.		Begin training silviculture workers. Treat approximately 3300 ha of forest land in the process.	Continue training and treating more area.	Finish training.
4002	To provide for the management and administration of the Canada-NLFTA Cooperation Training Agreement by Forestry Canada.	This is a new study.	Same as above	Same as above	Final year of study.

8. LONG TERM PROJECTIONS

- 3235 This is a three-year program, over the course of which 325 silviculture workers will be trained.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

- 3235 This is a cost-shared agreement between the Government of Canada (Atlantic Canada Opportunities Agency, Forestry Canada, and Employment and Immigration Canada) and the Newfoundland and Labrador Forestry Training Association, representing Abitibi-Price Inc., Corner Brook Pulp and Paper Ltd. and the provincial department of Forestry and Agriculture.

10. EVALUATIONS

- 3235 This program is subject to periodic in-house review to evaluate progress towards set objectives.

11. RESOURCE ALLOCATION

Refer to next page.

FORESTRY
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/40 [RR/PP]
 TITLE: COOPERATION TRAINING AGREEMENT
 RESP. CENTRE: 4155 LEADER: BUTLER, J.M.
 PROGRAM: STATUS: A (A/I/F/D) SUB-ELEMENT: 3213
 EVALUATION-PREV: / NEXT: /

1988-89 ACTUAL 00/00/00	1989-90 BUDGET 00/00/00	1989-90 REVISED 00/00/00	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$0.0	\$0.0	\$34.4	\$32.6	\$0.0	\$0.0	\$0.0
O&M	\$0.0	\$0.0	\$0.0	\$100.0	\$97.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$0.0	\$0.0	\$0.0	\$100.0	\$97.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$2,900.0	\$2,900.0	\$0.0	\$0.0
TOTL	\$0.0	\$0.0	\$34.4	\$3,032.6	\$2,997.0	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PY-O	0.0	0.0	1.0	1.0	0.0	0.0	0.0
TOTL	0.0	0.0	1.0	1.0	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION

TECHNOLOGY CENTRES POLICY (\$000)			
A	Contracting-In	\$.	(External Agencies)
B	Grants and Contributions	\$.	(External Agencies)
C1	In-Kind Contributions	\$.	(Forestry Canada)
C2	In-Kind Contributions	\$.	(External Agencies)
D	Royalties and Licenses	\$.	

FORESTRY CANADA
NEWFOUNDLAND AND LABRADOR REGION
Program Plan 1990/91 - 1992/93

1. PROJECT : 3251 AGREEMENT ADMINISTRATION AND TECHNOLOGY TRANSFER

2. FORESTRY CANADA PROGRAM : 3200/3250

3. PROJECT PROFILE : 1990/91

Project Leader : J.M. BUTLER

Total A-Base P/Y's : 2.0

Total A-Base O&M : 0.0

Total Other P/Y's : 0.0

Total Other O&M : 0.0

Strategic Forest Sector Issues: 2, 3, 5, 8, 9

Studies:

3601 AGREEMENT IMPLEMENTATION AND TECHNOLOGY TRANSFER

Study Leader : J.M. BUTLER

A-Base P/Y's : 2.0

A-Base O & M : 0.0K

Initiated : 1986

Other P/Y's : 0.0

Other O & M : 0.0

4. PROBLEM DEFINITION

3251 Since 1982, when Forestry Canada assumed its development responsibility in the forest sector, a number of major initiatives have been implemented. The current initiative, the Canada-Newfoundland Forest Resource Development Agreement, was signed in 1986 and is now in its final pay-out year. This Agreement, after recent amendments, is valued at \$51.2 million. In addition, there exists a need for the development and application of new technology into the forest sector of Newfoundland. The Development Branch will play a major role in facilitating the transfer of new technologies into the forest sector.

5. OBJECTIVES

a) Project Objectives

3251 The objectives are (1) to discharge federal responsibilities for the implementation and evaluation of Forestry Agreements in Newfoundland and Labrador, (2) to facilitate the transfer of new technology into the forest sector in Newfoundland and (3) to implement forestry employment development programs as required.

b) Study Objectives

- 3601 To provide ForCan management with technical input into the committees which oversee the implementation of forestry agreement projects. To monitor agreement programs and maintain a management information system on projects. To promote good communications and cooperation between Forestry Canada and agencies implementing agreement programs.

6. PROGRESS AND ACHIEVEMENTS

a) Project Background

- 3251 Since the FRDA is in its final pay-out year, the total amount of \$51.2 million is either spent or committed to projects to be completed this year. The bulk of Agreement activities concentrated on intensive forest management, technology transfer, operational research and development with a small component for Agreement administration.

b) Project Highlights, 1989/90

Nil

c) Information and Technology Transfer, 1989/90

i) Journal Publications:

Nil

ii) Information Reports

Nil

iii) Other Reports

- 3601 Veitch, G.K. 1990. Monitoring review of 1989 operational silviculture projects. Internal Report. 14 pp.
- Veitch, G.K. 1990. Monitoring review of 1989 private woodlot management projects. Internal Report. 10 pp.
- Veitch, G.K. 1990. Monitoring review of 1989 FRDA forest products projects. Internal Report. 17 pp.
- Veitch, G.K. 1990. Monitoring review of 1989 forest access road projects. Internal Report. 6 pp.

iv) Lectures, Seminars, and Scientific Addresses:

Nil

v) Other Technology Transfer:

- 3601 Two Christmas tree specialists were brought to Newfoundland from the Maritimes to conduct a number of seminars on Christmas tree culture. These were held in eastern and western regions of the province.

GOALS VS. ACHIEVEMENTS 1989/90			3 YEAR STUDY GOALS			
STUDY	GOALS	ACHIEVEMENTS	1990/91	1991/92	1992/93	
3601	This is the final pay-out year for the current agreement. Initiate planning for new FRDA.	Negotiations toward new Agreement ongoing.	Administer new Agreement	Administer new Agreement	Administer Agreement	

8. LONG TERM PROJECTIONS

3251 The Agreement is in its final pay-out year.

9. MAJOR COOPERATORS AND CLIENT AGENCIES

3251 Close liaison is maintained with the provincial departments of Forestry and Agriculture, Intergovernmental Affairs and Career Development. Cooperating federal agencies include ACOA, DIST, CEIC, Transport Canada and Parks Canada. In addition, contacts are also maintained with various industrial organizations.

10. EVALUATIONS

3251 The project is subject to periodic in-house review to evaluate progress towards objectives and to establish priorities for new initiatives. Also, Forestry Agreements are evaluated annually.

11. RESOURCE ALLOCATION

Refer to next page.

FOREST
CANADAINTEGRATED MANAGEMENT PLANNING SYSTEM
PROJECT SUMMARY (1989-90)

PROJECT #: 01/36 [RR/PP]
 TITLE: AGREEMENT ADMINISTRATION
 RESP. CENTRE: 4151 LEADER: BUTLER, J.M.
 PROGRAM: 00 STATUS: A (A/I/F/D) SUB-ELEMENT: 3251
 EVALUATION-PREV: 00/00 NEXT: 00/00

1988-89 ACTUAL 31/03/89	1989-90 BUDGET 01/04/89	1989-90 REVISED 01/04/89	1990-91 UPCOMING 00/00/00	PLANNING YEAR 1	PLANNING YEAR 2	PLANNING YEAR 3
-------------------------------	-------------------------------	--------------------------------	---------------------------------	--------------------	--------------------	--------------------

FINANCIAL RESOURCES (\$000)							
SAL	\$92.5	\$87.4	\$87.4	\$87.2	\$0.0	\$0.0	\$0.0
O&M	\$14.5	\$10.0	\$10.0	\$0.0	\$0.0	\$0.0	\$0.0
CNTR	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$11.5	\$10.0	\$10.0	\$0.0	\$0.0	\$0.0	\$0.0
CAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
G&C	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTL	\$107.0	\$97.4	\$97.4	\$87.2	\$0.0	\$0.0	\$0.0

PERSON YEARS - PROFESSIONAL & OTHER							
PY-P	2.0	2.0	2.0	2.0	0.0	0.0	0.0
PY-O	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTL	2.0	2.0	2.0	2.0	0.0	0.0	0.0

COOPERATORS RESOURCES (\$000)							
TOTL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

DESCRIPTION
 TO DISCHARGE CFS RESPONSIBILITIES FOR THE IMPLEMENTATION AND EVALUATION OF
 FEDERAL - PROVINCIAL FORESTRY AGREEMENTS FOR NEWFOUNDLAND.

TECHNOLOGY CENTRES POLICY (\$000)							
A	Contracting-In		\$.		(External Agencies)		
B	Grants and Contributions		\$.		(External Agencies)		
C1	In-Kind Contributions		\$.		(Forestry Canada)		
C2	In-Kind Contributions		\$.		(External Agencies)		
D	Royalties and Licenses		\$.				